



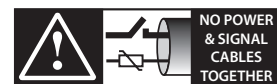
## Sensors DP

Sensori di temperatura - umidità  
Temperature and humidity sensors  
CO2 - VOC - PM2,5 - PM10



# MANUALE D'USO USER MANUAL

→ **LEGGI E CONSERVA  
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### Sonde DP

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## AVVERTENZE GENERALI



CAREL basa lo sviluppo dei suoi prodotti su una esperienza pluridecennale nel campo HVAC, sull'investimento continuo in innovazione tecnologica di prodotto, su procedure e processi di qualità rigorosi con test in-circuit e funzionali sul 100% della sua produzione, sulle più innovative tecnologie di produzione disponibili nel mercato. CAREL e le sue filiali/affiliate non garantiscono tuttavia che tutti gli aspetti del prodotto e del software incluso nel prodotto risponderanno alle esigenze dell'applicazione finale, pur essendo il prodotto costruito secondo le tecniche dello stato dell'arte. Il cliente (costruttore, progettista o installatore dell'equipaggiamento finale) si assume ogni responsabilità e rischio in relazione alla configurazione del prodotto per il raggiungimento dei risultati previsti in relazione all'installazione e/o equipaggiamento finale specifico. CAREL in questo caso, previ accordi specifici, può intervenire come consulente per la buona riuscita dello start-up macchina finale/applicazione, ma in nessun caso può essere ritenuta responsabile per il buon funzionamento dell'equipaggiamento/impianto finale. Il prodotto CAREL è un prodotto avanzato, il cui funzionamento è specificato nella documentazione tecnica fornita col prodotto o scaricabile, anche anteriormente all'acquisto, dal sito internet [www.carel.com](http://www.carel.com). Ogni prodotto CAREL, in relazione al suo avanzato livello tecnologico, necessita di una fase di qualifica / configurazione / programmazione / commissioning affinché possa funzionare al meglio per l'applicazione specifica. La mancanza di tale fase di studio, come indicata nel manuale, può generare malfunzionamenti nei prodotti finali di cui CAREL non potrà essere ritenuta responsabile. Soltanto personale qualificato può installare o eseguire interventi di assistenza tecnica sul prodotto. Il cliente finale deve usare il prodotto solo nelle modalità descritte nella documentazione relativa al prodotto stesso. Senza che ciò escluda la doverosa osservanza di ulteriori avvertenze presenti nel manuale, si evidenzia che è in ogni caso necessario, per ciascun prodotto di CAREL:

- evitare che i circuiti elettronici si bagnino. La pioggia, l'umidità e tutti i tipi di liquidi o la condensa contengono sostanze minerali corrosive che possono danneggiare i circuiti elettronici. In ogni caso il prodotto va usato o stoccato in ambienti che rispettano i limiti di temperatura ed umidità specificati nel manuale;
- non installare il dispositivo in ambienti particolarmente caldi. Temperature troppo elevate possono ridurre la durata dei dispositivi elettronici, danneggiarli e deformare o fondere le parti in plastica. In ogni caso il prodotto va usato o stoccato in ambienti che rispettano i limiti di temperatura ed umidità specificati nel manuale;
- non tentare di aprire il dispositivo in modi diversi da quelli indicati nel manuale;
- non fare cadere, battere o scuotere il dispositivo, poichè i circuiti interni e i meccanismi potrebbero subire danni irreparabili;
- non usare prodotti chimici corrosivi, solventi o detergenti aggressivi per pulire il dispositivo;
- non utilizzare il prodotto in ambiti applicativi diversi da quanto specificato nel manuale tecnico.

Tutti i suggerimenti sopra riportati sono validi altresì per il controllo, schede seriali, chiavi di programmazione o comunque per qualunque altro accessorio del portfolio prodotti CAREL.

CAREL adotta una politica di continuo sviluppo. Pertanto CAREL si riserva il diritto di effettuare modifiche e miglioramenti a qualsiasi prodotto descritto nel presente documento senza previo preavviso. I dati tecnici presenti nel manuale possono subire modifiche senza obbligo di preavviso. La responsabilità di CAREL in relazione al proprio prodotto è regolata dalle condizioni generali di contratto CAREL editate nel sito [www.carel.com](http://www.carel.com) e/o da specifici accordi con i clienti; in particolare, nella misura consentita dalla normativa applicabile, in nessun caso CAREL, i suoi dipendenti o le sue filiali/affiliate saranno responsabili di eventuali mancati guadagni o vendite, perdite di dati e di informazioni, costi di merci o servizi sostitutivi, danni a cose o persone, interruzioni di attività, o eventuali danni diretti, indiretti, incidentali, patrimoniali, di copertura, punitivi, speciali o consequenziali in qualunque modo causati, siano essi contrattuali, extra contrattuali o dovuti a negligenza o altra responsabilità derivanti dall'installazione, utilizzo o impossibilità di utilizzo del prodotto, anche se CAREL o le sue filiali/affiliate siano state avvisate della possibilità di danni.

## SMALTIMENTO



Fig. 1



Fig. 2

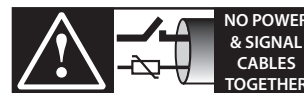
### INFORMAZIONI SUL CORRETTO SMALTIMENTO DEI RIFIUTI DI APPARECCHIATURE ELETTRICHE ED ELETTRONICHE (RAEE)

Il prodotto è composto da parti in metallo e da parti in plastica. In riferimento alla Direttiva 2002/96/CE del Parlamento Europeo e del Consiglio del 27 gennaio 2003 e alle relative normative nazionali di attuazione, Vi informiamo che:

- sussiste l'obbligo di non smaltire i RAEE come rifiuti urbani e di effettuare, per detti rifiuti, una raccolta separata;
- per lo smaltimento vanno utilizzati i sistemi di raccolta pubblici o privati previsti dalle leggi locali. È inoltre possibile riconsegnare al distributore l'apparecchiatura a fine vita in caso di acquisto di una nuova;
- questa apparecchiatura può contenere sostanze pericolose: un uso improprio o uno smaltimento non corretto potrebbe avere effetti negativi sulla salute umana e sull'ambiente;
- il simbolo (contenitore di spazzatura su ruote barrato) riportato sul prodotto o sulla confezione e sul foglio istruzioni indica che l'apparecchiatura è stata immessa sul mercato dopo il 13 Agosto 2005 e che deve essere oggetto di raccolta separata;
- in caso di smaltimento abusivo dei rifiuti elettrici ed elettronici sono previste sanzioni stabilite dalle vigenti normative locali in materia di smaltimento.

**Garanzia sui materiali:** 2 anni (dalla data di produzione, escluse le parti di consumo).

**Omologazioni:** la qualità e la sicurezza dei prodotti CAREL S.p.A. sono garantite dal sistema di progettazione e produzione certificato ISO 9001.



**READ CAREFULLY IN THE TEXT!**

Separare quanto più possibile i cavi delle sonde e degli ingressi digitali dai cavi dei carichi induttivi e di potenza per evitare possibili disturbi elettromagnetici. Non inserire mai nelle stesse canaline (comprese quelle dei quadri elettrici) cavi di potenza e cavi di segnale.

### Legenda simboli:



**Attenzione:** pone all'attenzione dell'utente argomenti critici per l'utilizzo del prodotto.



**Nota:** quando si vuol porre l'attenzione su qualche argomento di particolare importanza; in particolare sul lato pratico di utilizzo delle varie funzionalità del prodotto.



**Attenzione:** questo prodotto va incorporato e/o integrato in un apparecchio o macchina finale. La verifica di conformità alle leggi e alle normative tecniche vigenti nel Paese in cui l'apparecchio o la macchina finale verranno utilizzati è responsabilità del costruttore stesso. Prima della consegna del prodotto, Carel ha già effettuato le verifiche e i test previsti dalle direttive Europee e relative norme armonizzate, utilizzando un setup di prova tipico, da intendersi non rappresentativo di tutte le condizioni di installazione finale.



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# 1. INTRODUZIONE

Per una sempre più maggiore integrazione dei dispositivi, CAREL offre soluzioni complete ed avanzate in grado di rispondere alla maggior parte delle applicazioni richieste dal mercato.

CAREL infatti propone sistemi di controllo e umidificazione per il mercato HVAC/R, che comprende, controllori, umidificatori, recuperatori, strumenti per la supervisione e una vasta gamma di accessori tra cui i sensori per la misurazione dei parametri ambientali. Per questo motivo CAREL offre un'intera gamma di sensori che rispondono alle esigenze di installatori e produttori per il mercato HVAC/R, con soluzioni tecnologiche innovative, e perfettamente rispondenti ai principali standard di mercato.

La gamma prevede sensori con differenti utilizzi, alloggiati in ambiente, condotta, e ambiente tecnico, e sensori di qualità dell'aria, che garantiscono requisiti e compatibilità con i controllori e con la qualità che contraddistingue i prodotti CAREL.

La gamma include i modelli della serie DP-TH nelle versioni temperatura e umidità con uscita analogica 4...20mA, 0...10V e uscita seriale RS485 (Carel o Modbus), e i modelli della serie DP-IAQ (indoor Air Quality) nelle versioni temperatura, umidità CO<sub>2</sub>, VOC (composti organici volatili) PM<sub>2,5</sub> e PM<sub>10</sub> con uscita seriale RS485 (Modbus). I sensori della serie DP\* utilizzano sensori con uscita digitale, offrendo una buona precisione con un ottimo rapporto prezzo/qualità. Questi sensori, tipicamente sono utilizzati insieme ai controllori Carel, ma possono essere utilizzati anche con controllori di terze parti perché hanno uscite standard e quindi facili da collegare e integrare.

## 1.1 Caratteristiche generali

CAREL ha progettato un'intera gamma di sensori che rispondono alle esigenze del mercato per la regolazione delle unità HVAC/R. I sensori CAREL, oltre ad essere caratterizzati da prestazioni riconosciute che le contraddistinguono, sono molto versatili e possono soddisfare le più svariate esigenze di mercato. La gamma prevede sensori di temperatura e umidità della serie DP-TH, e sensori della serie DP-IAQ, per il rilevamento dei parametri quali: Temperatura, Umidità, CO<sub>2</sub>, V.O.C. (Volatile Organic Compound), PM<sub>2,5</sub> e PM<sub>10</sub>. Tutti i sensori sono stati progettati per essere compatibili non solo con tutti i controllori CAREL, ma anche con gli standard più comunemente utilizzati nel mercato. Sono disponibili nei seguenti modelli: a) ambiente, b) ambiente tecnico, c) condotta, per installazioni residenziale o industriale.

### 1.1.1 Sensori DP-IAQ

I sensori qualità dell'aria Carel, analizzano attraverso la misurazione della temperatura, umidità, CO<sub>2</sub> (anidride carbonica), VOC (Composti organici volatili), PM<sub>2,5</sub> e PM<sub>10</sub> i principali parametri che esprimono il livello di inquinamento negli ambienti per avere in unico sensore tutto ciò di cui il mercato delle unità HVAC/R richiede.

Disponibili in varie combinazioni con versione di montaggio a parete e a condotta, presentano un'uscita con comunicazione seriale RS485 Modbus per il collegamento e l'integrazione al sistema Carel.

Con display



Senza display



Fig. 1.a

#### Sensori ambiente (DPWQ\*)

Vengono utilizzati in ambiente, in impianti di ventilazione condizionamento e dove è necessario misurare la salubrità dell'aria. Sono predisposti per il montaggio a parete. Disponibili nella versione con e senza display.



Fig. 1.b

#### Sensori da condotta (DPDQ\*)

Vengono utilizzati negli impianti di riscaldamento e condizionamento che fanno uso di condotte. Sono forniti insieme ad una staffa per il loro fissaggio. Disponibile la versione senza display.

### 1.1.2 Sensori DP-TH

I sensori DP-TH Carel, misurano la temperatura e umidità per le unità del mercato HVAC/R. Disponibili in combinazioni, solo temperatura, temperatura e umidità, nella versione montaggio a parete e a condotta. Entrambe le versioni hanno un uscita analogica e seriale RS485 (protocollo Modbus e Carel), per il collegamento e l'integrazione ai dispositivi del sistema Carel.



Fig. 1.c

#### Sensori ambiente (DPW\*)

Vengono utilizzati in impianti di riscaldamento e condizionamento. Presentano un'estetica adatta ad un utilizzo in ambiente residenziale domestico. Sono predisposti per il montaggio a parete.



Fig. 1.d

#### Sensori per ambiente tecnico (DPP\*)

Vengono utilizzati in ambienti tecnici (celle di conservazione, piscine ecc.) dove sia richiesto un elevato grado di protezione del contenitore (IP55) e dei sensori (IP54). Sono predisposti per il montaggio a parete.



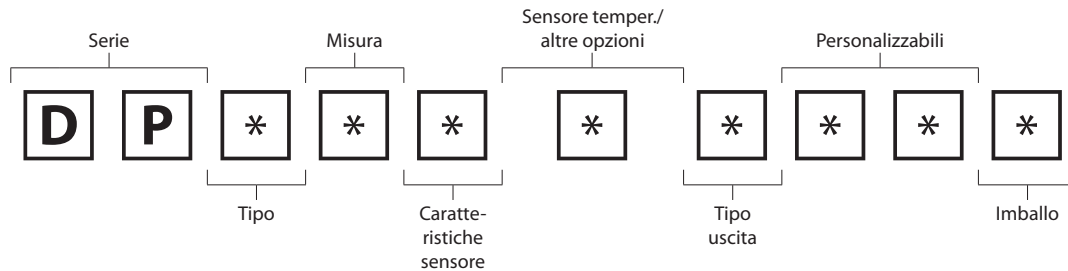
Fig. 1.e

#### Sensori da condotta (DPD\*)

Vengono utilizzati negli impianti di riscaldamento e condizionamento che fanno uso di condotte. Sono forniti insieme ad una staffa per il loro fissaggio.



# 2. CODIFICA E CODICI DISPONIBILI



|                                |  |
|--------------------------------|--|
| <b>Serie:</b>                  | DP (Digital sensor)  |
| <b>Tipo:</b>                   | W = Ambiente<br>P = Ambiente tecnico<br>D = Condotta   |
| <b>Misura:</b>                 | T = Temperatura<br>H = Umidità<br>C = Temperatura e Umidità.<br>Q = Qualità dell'aria interna  |
| <b>Caratteristiche sensore</b> | 0 = Non presente;<br>1 = 10...90%rh;<br>2 = 0...100%rh.<br>6 = T H (range 0...50°C)<br>7 = T H (range 0...50°C), CO2 (5000ppm)<br>8 = T H (range 0...50°C), CO2 (5000ppm), VOC<br>9 = T H (range 0...50°C), CO2 (5000ppm), VOC, PM2.5 - PM10 |

|  |  |
|--|--|
| <b>Tipo sensore temperatura e altre opzioni:</b> | 0 = Non presente;<br>1 = NTC.<br>Se digit 4 è Q → 0= Versione senza display<br>→ 1= Version con display  |
| <b>Tipo uscita:</b>                              | 0 = Uscita 0...1Vdc o 4...20mA;<br>1 = Uscita 0...1V o 4...20mA ed NTC resistiva;<br>2 = Uscita 0...10Vdc;<br>4 = Uscita seriale RS485 optoisolata Modbus/Carel;<br>5 = Uscita 0...10V ed NTC resistiva<br>B = Uscita seriale optoisolata RS485 Modbus |
| <b>Person. Cliente:</b>                          | 01= Colore RAL9010 con logo Carel  |
| <b>Imballo:</b>                                  | 0 = Singolo;<br>1 = Multiplo;<br>N = Neutro;<br>* = Personalizzato   |

Tab. 2.a

La tabella seguente riporta i codici disponibili.

| Codice prodotto | Descrizione  | new | Alim.        | Tipo di installazione |                    |               | Display   |        | Parametri rilevabili |       |     |     | Segnali di uscita |        |          |           |         |
|-----------------|--|-----|--------------|-----------------------|--------------------|---------------|-----------|--------|----------------------|-------|-----|-----|-------------------|--------|----------|-----------|---------|
|                 |  |     |              | Cond.                 | Pannello amb. ind. | Pannello amb. | No displ. | Displ. | Temp.                | %R.H. | CO2 | VOC | PM 2.5/10         | RS 485 | 0...10 V | 4...20 mA | NTC 10K |
| DPWT010000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       |                    | •             | •         |        | •                    |       |     |     |                   |        |          | •         |         |
| DPWT011000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       |                    | •             | •         |        | •                    |       |     |     |                   |        |          |           | •       |
| DPWC111000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       |                    | •             | •         |        | •                    | •     |     |     |                   |        |          | •         | •       |
| DPWC110000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       |                    | •             | •         |        | •                    | •     |     |     |                   |        |          | •         |         |
| DPWC115000      | Versione ambiente, uscita 0...10 Vdc                     |     | 12-24 Vac/dc |                       |                    | •             | •         |        | •                    | •     |     |     |                   |        | •        |           | •       |
| DPWC112000      | Versione ambiente, uscita 0...10 Vdc                     |     | 12-24 Vac/dc |                       |                    | •             | •         |        | •                    | •     |     |     |                   |        | •        |           |         |
| DPWC114000      | Versione ambiente, uscita seriale RS485 optoisolata      |     | 12-24 Vac/dc |                       |                    | •             | •         |        | •                    | •     |     |     | •                 |        |          |           |         |
| DPWT014000      | Versione ambiente, uscita seriale RS485 optoisolata      |     | 12-24 Vac/dc |                       |                    | •             | •         |        | •                    |       |     |     | •                 |        |          |           |         |
| DPPT010000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    |       |     |     |                   |        |          | •         |         |
| DPPT011000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    |       |     |     |                   |        |          |           | •       |
| DPPC111000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    | •     |     |     |                   |        |          | •         | •       |
| DPPC110000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    | •     |     |     |                   |        |          | •         |         |
| DPPC210000      | Versione ambiente, uscita 0...1 V/-0,5...1 Vdc/4...20 mA |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    | •     |     |     |                   |        |          | •         |         |
| DPPC112000      | Versione ambiente, uscita 0...10 Vdc                     |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    | •     |     |     |                   |        | •        |           |         |
| DPPC212000      | Versione ambiente, uscita 0...10 Vdc                     |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    | •     |     |     |                   |        | •        |           |         |
| DPPT014000      | Versione ambiente, uscita seriale RS485 optoisolata      |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    |       |     |     | •                 |        |          |           |         |
| DPPC114000      | Versione ambiente, uscita seriale RS485 optoisolata      |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    | •     |     |     | •                 |        |          |           |         |
| DPPC214000      | Versione ambiente, uscita seriale RS485 optoisolata      |     | 12-24 Vac/dc |                       | •                  |               | •         |        | •                    | •     |     |     | •                 |        |          |           |         |
| DPDT010000      | Versione condotta uscita 0...1 V/-0,5...1 Vdc/4...20 mA) |     | 12-24 Vac/dc | •                     |                    |               | •         |        | •                    |       |     |     |                   |        |          | •         |         |
| DPDT011000      | Versione condotta uscita 0...1 V/-0,5...1 Vdc/4...20 mA) |     | 12-24 Vac/dc | •                     |                    |               | •         |        | •                    |       |     |     |                   |        |          |           | •       |

| Codice prodotto | Descrizione  | new | Alim.        | Tipo di installazione |                    |               | Display   |        | Parametri rilevabili |       |     |     |           | Segnali di uscita |          |           |         |
|-----------------|--|-----|--------------|-----------------------|--------------------|---------------|-----------|--------|----------------------|-------|-----|-----|-----------|-------------------|----------|-----------|---------|
|                 |  |     |              | Cond.                 | Pannello amb. ind. | Pannello amb. | No displ. | Displ. | Temp.                | %R.H. | CO2 | VOC | PM 2.5/10 | RS 485            | 0...10 V | 4...20 mA | NTC 10K |
| DPDC111000      | Versione condotta uscita 0...1 V/-0,5...1 Vdc/4...20 mA) |     | 12-24 Vac/dc | ●                     |                    |               | ●         |        | ●                    | ●     |     |     |           |                   |          | ●         | ●       |
| DPDC110000      | Versione condotta uscita 0...1 V/-0,5...1 Vdc/4...20 mA) |     | 12-24 Vac/dc | ●                     |                    |               | ●         |        | ●                    | ●     |     |     |           |                   |          | ●         |         |
| DPDC210000      | Versione condotta uscita 0...1 V/-0,5...1 Vdc/4...20 mA) |     | 12-24 Vac/dc | ●                     |                    |               | ●         |        | ●                    | ●     |     |     |           |                   |          | ●         |         |
| DPDC112000      | Versione condotta uscita 0...10 Vdc                      |     | 12-24 Vac/dc | ●                     |                    |               | ●         |        | ●                    | ●     |     |     |           |                   | ●        |           |         |
| DPDC212000      | Versione condotta uscita 0...10 Vdc                      |     | 12-24 Vac/dc | ●                     |                    |               | ●         |        | ●                    | ●     |     |     |           |                   | ●        |           |         |
| DPDT014000      | Versione condotta uscita seriale RS485 optoisolata       |     | 12-24 Vac/dc | ●                     |                    |               | ●         |        | ●                    |       |     |     |           | ●                 |          |           |         |
| DPDC114000      | Versione condotta uscita seriale RS485 optoisolata       |     | 12-24 Vac/dc | ●                     |                    |               | ●         |        | ●                    | ●     |     |     |           | ●                 |          |           |         |
| DPDC214000      | Versione condotta uscita seriale RS485 optoisolata       |     | 12-24 Vac/dc | ●                     |                    |               | ●         |        | ●                    | ●     |     |     |           | ●                 |          |           |         |
| DPWQ306000      | Wall air quality sensor VOC (uscita 0-10Vdc o 4-20mA)    |     | 24 Vac/Vdc   |                       |                    | ●             | ●         |        |                      |       |     | ●   |           |                   |          | ●         | ●       |
| DPWQ402000      | Wall air quality sensor CO2 (uscita 0-10Vdc)             |     | 24 Vac/Vdc   |                       |                    | ●             | ●         |        |                      |       | ●   |     |           |                   |          | ●         | ●       |
| DPWQ502000      | Wall air quality sensor VOC e CO2 (uscita 0-10Vdc)       |     | 24 Vac/Vdc   |                       |                    | ●             | ●         |        |                      |       | ●   | ●   |           |                   |          | ●         | ●       |
| DPDQ306000      | Duct air quality sensor VOC (uscita 0-10Vdc o 4-20mA)    |     | 24 Vac/Vdc   | ●                     |                    |               | ●         |        |                      |       |     | ●   |           |                   |          | ●         | ●       |
| DPDQ402000      | Duct air quality sensor CO2 (uscita 0-10Vdc)             |     | 24 Vac/Vdc   | ●                     |                    |               | ●         |        |                      |       |     | ●   |           |                   |          | ●         | ●       |
| DPDQ502000      | Duct air quality sensor VOC e CO2 (uscita 0-10Vdc)       |     | 24 Vac/Vdc   | ●                     |                    |               | ●         |        |                      |       |     | ●   | ●         |                   |          | ●         | ●       |
| DPWQ60B010      | Temperature, Humidity                                    | ●   | 24 Vac/Vdc   |                       |                    | ●             | ●         |        | ●                    | ●     |     |     |           |                   | ●        |           |         |
| DPWQ70B010      | Temperature, Humidity, CO2                               | ●   | 24 Vac/Vdc   |                       |                    | ●             | ●         |        | ●                    | ●     | ●   |     |           |                   | ●        |           |         |
| DPWQ80B010      | Temperature, Humidity, CO2 VOC                           | ●   | 24 Vac/Vdc   |                       |                    | ●             | ●         |        | ●                    | ●     | ●   | ●   |           |                   | ●        |           |         |
| DPWQ90B010      | Temperature, Humidity, CO2 VOC PM2,5 PM10                | ●   | 24 Vac/Vdc   |                       |                    | ●             | ●         |        | ●                    | ●     | ●   | ●   | ●         |                   | ●        |           |         |
| DPWQ61B010      | Temperature, Humidity                                    | ●   | 24 Vac/dc    |                       |                    | ●             |           | ●      | ●                    | ●     |     |     |           |                   | ●        |           |         |
| DPWQ71B010      | Temperature, Humidity, CO2                               | ●   | 24 Vac/dc    |                       |                    | ●             |           | ●      | ●                    | ●     | ●   |     |           |                   | ●        |           |         |
| DPWQ81B010      | Temperature, Humidity, CO2 VOC                           | ●   | 24 Vac/dc    |                       |                    | ●             |           | ●      | ●                    | ●     | ●   | ●   |           |                   | ●        |           |         |
| DPWQ91B010      | Temperature, Humidity, CO2 VOC PM2,5 PM10                | ●   | 24 Vac/dc    |                       |                    | ●             |           | ●      | ●                    | ●     | ●   | ●   | ●         |                   | ●        |           |         |
| DPDQ60B010      | Temperature, Humidity                                    | ●   | 24 Vac/dc    | ●                     |                    |               | ●         |        | ●                    | ●     |     |     |           |                   | ●        |           |         |
| DPDQ70B010      | Temperature, Humidity, CO2                               | ●   | 24 Vac/dc    | ●                     |                    |               | ●         |        | ●                    | ●     | ●   |     |           |                   | ●        |           |         |

Tab. 2.b

# 3. INSTALLAZIONE SENSORI DP-IAQ

## 3.1 Montaggio e fissaggio dello strumento

L'installazione dello strumento dipende dalla versione di prodotto acquistata.

### Versione a parete

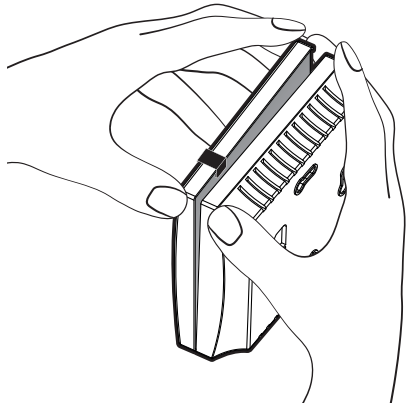


Fig. 3.a

Se il prodotto è appena stato acquistato, sul prodotto è previsto un separatore che divide il guscio inferiore dal guscio superiore per semplificare l'apertura dello strumento.

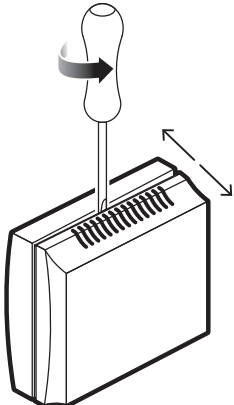


Fig. 3.b

Se è già stato rimosso il separatore, si può comunque aprire il prodotto tramite un cacciavite in questo modo

Inserire un cacciavite nel mezzo della fessura, premere verso il basso e sollevare leggermente il telaio del fondo. Tirare in avanti il coperchio e trattenere.

Una volta separate le 2 parti del prodotto procedere all'installazione tramite delle viti acquistate separatamente.  
 Per la versione di prodotto a parete si consiglia utilizzo di viti con diametro massimo 3mm.  
 Per la versione di prodotto a condotta si consiglia l'utilizzo di viti con diametro massimo 5mm.  
 Se acquistata la versione con sensore di PM2.5/PM10, fare attenzione a non danneggiare i fili di collegamento tra la parte inferiore e superiore.

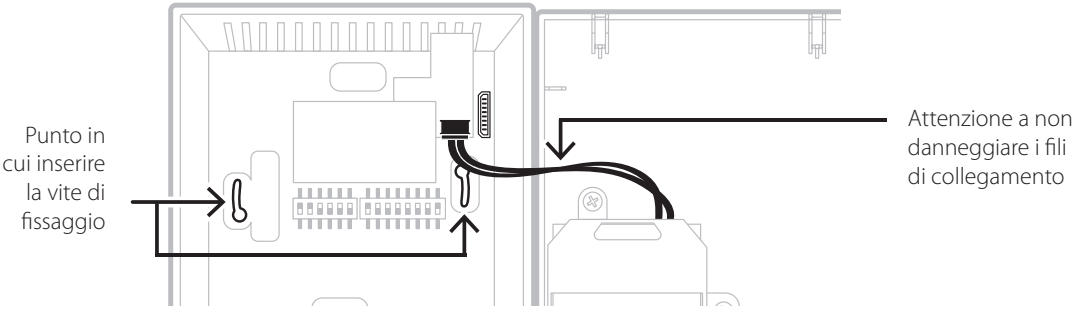


Fig. 3.c

## Versione a condotta

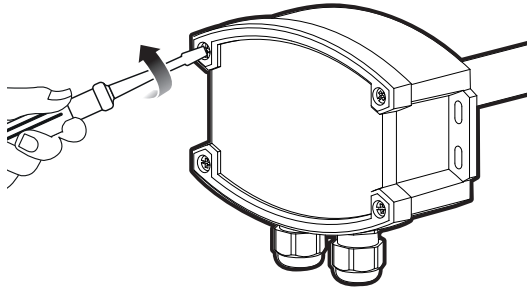


Fig. 3.d

Svitare le 4 viti di tipo a sgancio rapido

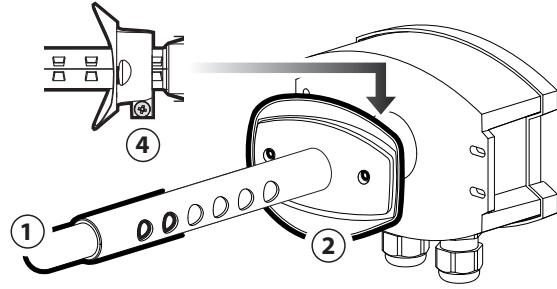


Fig. 3.e

1. Si consiglia di scegliere la sezione della condotta in modo adeguato. La punta del sensore deve essere posizionato in una zona di buona aereazione.
2. Installare il supporto di isolamento alla condotta fissandolo con 2 viti, sugli appositi alloggiamenti.
3. Infilare lo stelo del sensore all'interno del supporto di isolamento.
4. Stringere la vite di fissaggio della staffa, per bloccare il sensore sulla condotta.

## Schema di montaggio

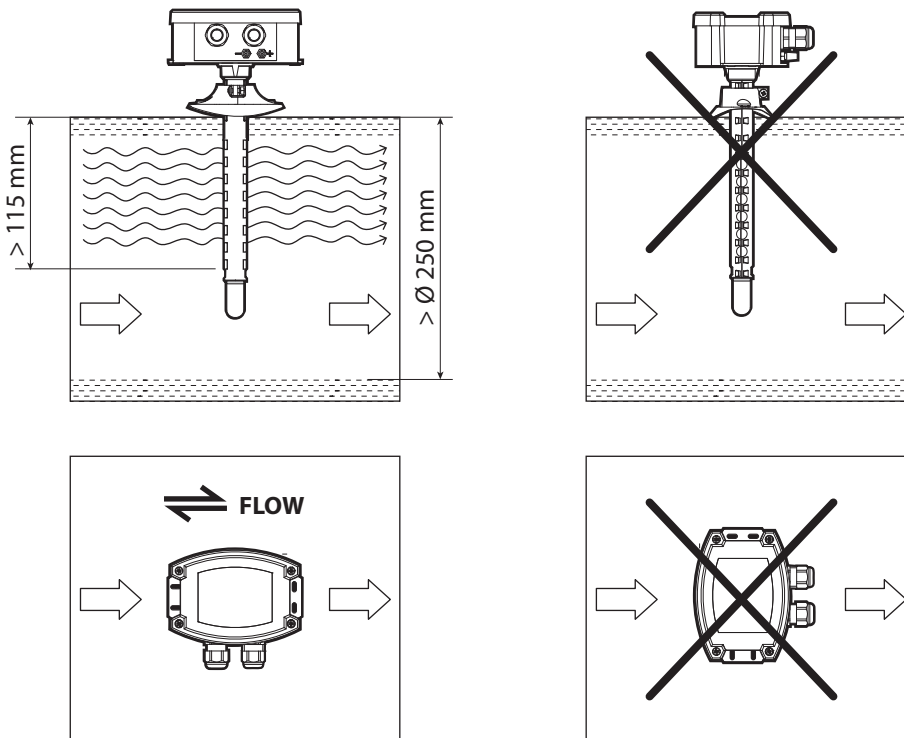
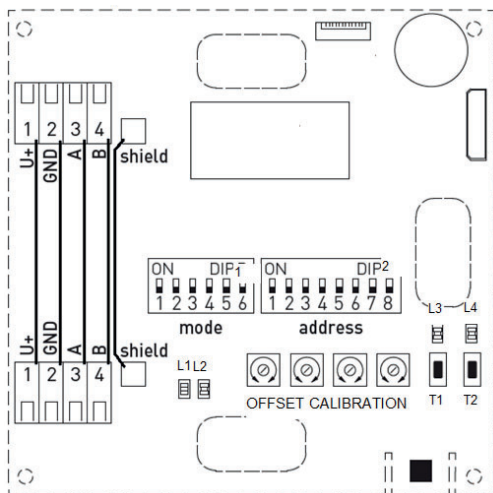


Fig. 3.f

## 3.2 Collegamenti elettrici e cablaggio sensore DP-IAQ

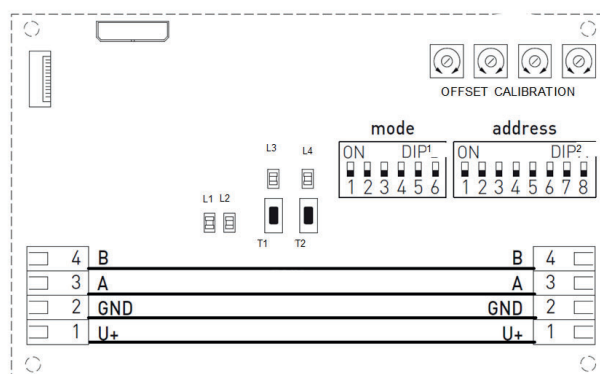
Eseguire i collegamenti elettrici come riportato sotto, facendo attenzione a seguire le polarità indicate

### Versione a parete



All'interno del prodotto è presente una doppia morsetteria per semplificare la connessione nel caso di più dispositivi. Nel caso non sia necessario utilizzare la doppia morsetteria è possibile collegare l'alimentazione e la seriale su un solo morsetto, oppure su un morsetto l'alimentazione e sull'altro la connessione seriale, sempre rispettando le indicazioni riportate sul prodotto

### Versione a condotta



#### Legenda:

|                     |  |
|---------------------|--|
| A:                  | TxRx+ uscita seriale RS485 positiva  |
| B:                  | TxRx- uscita seriale RS485 negativa  |
| GND                 | riferimento per alimentazione.<br>Nel caso Alimentazione Vac, collegare uno dei 2 fili del trasformatore.  |
| U+:                 | +24Vdc. Nel caso Alimentazione Vac, collegare il secondo filo del trasformatore.   |
| DIP1, DIP 2:        | dipswitch per l'impostazione della linea seriale   |
| L1...L4:            | led di stato   |
| OFFSET CALIBRATION: | Questi trimmer sono utilizzati per eseguire le tarature del sensore, non utilizzare durante il normale funzionamento del prodotto. In caso di manomissione restituire il prodotto. |
| T1:                 | tasto utilizzato per eseguire la taratura manuale del CO <sub>2</sub>  |
| T2:                 | tasto utilizzato per eseguire la taratura manuale del VOC  |

Tab. 3.a

Per effettuare il cablaggio, per la connessione seriale è necessario utilizzare un cavo multipolare schermato da 2 fili con le seguenti caratteristiche:

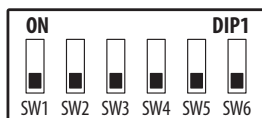
- a due fili ritorti;
- schermato, preferibilmente con filo di continuità;
- di sezione AWG20 (diam. 0,7±0,8 mm; area 0,39±0,5 mm<sup>2</sup>) o AWG22 (diam. 0,55±0,65 mm; area 0,24±0,33 mm<sup>2</sup>);
- capacità nominale tra i conduttori <100 pF/m.

Per l'alimentazione si consiglia un cavo bipolare da 2 fili sez. massima 1,5 mm<sup>2</sup>

### 3.3 Configurazione del sensore DP-IAQ

La configurazione dei 2 dip-switch (DIP1, DIP2) permette l'indirizzamento, la modalità di trasmissione seriale e la velocità. Tramite il DIP 1 è possibile impostare la modalità di funzionamento della seriale, selezionare la velocità di trasmissione e tutti i parametri necessari per il corretto funzionamento dello strumento.

#### Dip1 Modbus mode setting



| Baud rate (selectable) | SW1 | SW2 | Parity (selectable) | SW3 | Parity check (on/off)               | SW4 | 8N1-MODBUS (on/off) | SW5 | Bus termination (on/off) | SW6 |
|------------------------|-----|-----|---------------------|-----|-------------------------------------|-----|---------------------|-----|--------------------------|-----|
| 9600 baud              | ON  | OFF | EVEN (numbered)     | ON  | Active (1 stop bit)                 | ON  | Active              | ON  | Active                   | ON  |
| 19200 baud             | ON  | ON  | ODD (numbered)      | OFF | Inactive (no parity) (12 stop bits) | OFF | Inactive (default)  | OFF | Inactive                 | OFF |
| 38400 baud             | OFF | ON  |                     |     |                                     |     |                     |     |                          |     |
| Reserved               | OFF | OFF |                     |     |                                     |     |                     |     |                          |     |

Tab. 3.b

Nel caso si attivi la funzione 8N1 (DIP1 SW5), viene automaticamente disabilitata la funzione Parity (DIP1 SW3) e la funzione Parity check (DIP1 SW4),

Attraverso il bit 6 di DIP 1 è possibile attivare o no la resistenza di terminazione di linea di 120ohm.

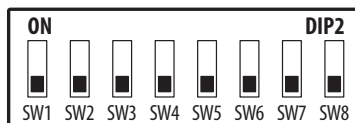
Fare attenzione di attivare questa resistenza solo sull'ultimo strumento della linea e non su quelli intermedi per garantire il corretto funzionamento del sistema. La resistenza di fine linea è attiva quando si seleziona Active.

Di seguito si riportano le impostazioni più comuni per permettere il migliore funzionamento con i sistemi Carel:

**SW1 ON, SW2 ON, SW3 --, SW4 OFF, SW5 OFF, SW6 OFF.**

Tramite il DIP 2 è possibile impostare l'indirizzo seriale dello strumento, selezionando tra 1 e 247

#### Dip2 Address setting



La regola per l'impostazione dell'indirizzo segue la regola delle codifica binaria, si veda la tabella di seguito riportata per selezionare in modo semplice e sicuro l'indirizzo che si vuole dare allo strumento.

#### Indirizzo seriale

|    | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |    | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON  | 31 | OFF | OFF | OFF | ON  | ON  | ON  | ON  | ON  |
| 2  | OFF | OFF | OFF | OFF | OFF | OFF | ON  | OFF | 32 | OFF | OFF | ON  | OFF | OFF | OFF | OFF | OFF |
| 3  | OFF | OFF | OFF | OFF | OFF | OFF | ON  | ON  | 33 | OFF | OFF | ON  | OFF | OFF | OFF | OFF | ON  |
| 4  | OFF | OFF | OFF | OFF | OFF | ON  | OFF | OFF | 34 | OFF | OFF | ON  | OFF | OFF | OFF | ON  | OFF |
| 5  | OFF | OFF | OFF | OFF | OFF | ON  | ON  | ON  | 35 | OFF | OFF | ON  | OFF | OFF | OFF | ON  | ON  |
| 6  | OFF | OFF | OFF | OFF | OFF | ON  | ON  | OFF | 36 | OFF | OFF | ON  | OFF | OFF | ON  | OFF | OFF |
| 7  | OFF | OFF | OFF | OFF | OFF | ON  | ON  | ON  | 37 | OFF | OFF | ON  | OFF | OFF | ON  | OFF | ON  |
| 8  | OFF | OFF | OFF | OFF | ON  | OFF | OFF | OFF | 38 | OFF | OFF | ON  | OFF | OFF | ON  | ON  | OFF |
| 9  | OFF | OFF | OFF | OFF | ON  | OFF | OFF | ON  | 39 | OFF | OFF | ON  | OFF | OFF | ON  | ON  | ON  |
| 10 | OFF | OFF | OFF | OFF | ON  | OFF | ON  | OFF | 40 | OFF | OFF | ON  | OFF | ON  | OFF | OFF | OFF |
| 11 | OFF | OFF | OFF | OFF | ON  | OFF | ON  | ON  | 41 | OFF | OFF | ON  | OFF | ON  | OFF | OFF | ON  |
| 12 | OFF | OFF | OFF | OFF | ON  | ON  | OFF | OFF | 42 | OFF | OFF | ON  | OFF | ON  | OFF | ON  | OFF |
| 13 | OFF | OFF | OFF | OFF | ON  | ON  | ON  | ON  | 43 | OFF | OFF | ON  | OFF | ON  | OFF | ON  | ON  |
| 14 | OFF | OFF | OFF | OFF | ON  | ON  | ON  | OFF | 44 | OFF | OFF | ON  | OFF | ON  | ON  | OFF | OFF |
| 15 | OFF | OFF | OFF | OFF | ON  | ON  | ON  | ON  | 45 | OFF | OFF | ON  | OFF | ON  | ON  | OFF | ON  |
| 16 | OFF | OFF | OFF | ON  | OFF | OFF | OFF | OFF | 46 | OFF | OFF | ON  | OFF | ON  | ON  | ON  | OFF |
| 17 | OFF | OFF | OFF | ON  | OFF | OFF | OFF | ON  | 47 | OFF | OFF | ON  | OFF | ON  | ON  | ON  | ON  |
| 18 | OFF | OFF | OFF | ON  | OFF | OFF | ON  | OFF | 48 | OFF | OFF | ON  | ON  | OFF | OFF | OFF | OFF |
| 19 | OFF | OFF | OFF | ON  | OFF | OFF | ON  | ON  | 49 | OFF | OFF | ON  | ON  | OFF | OFF | OFF | ON  |
| 20 | OFF | OFF | OFF | ON  | OFF | ON  | OFF | OFF | 50 | OFF | OFF | ON  | ON  | OFF | OFF | ON  | OFF |
| 21 | OFF | OFF | OFF | ON  | OFF | ON  | OFF | ON  | 51 | OFF | OFF | ON  | ON  | OFF | OFF | ON  | ON  |
| 22 | OFF | OFF | OFF | ON  | OFF | ON  | ON  | OFF | 52 | OFF | OFF | ON  | ON  | OFF | ON  | OFF | OFF |
| 23 | OFF | OFF | OFF | ON  | OFF | ON  | ON  | ON  | 53 | OFF | OFF | ON  | ON  | OFF | ON  | OFF | ON  |
| 24 | OFF | OFF | OFF | ON  | ON  | OFF | OFF | OFF | 54 | OFF | OFF | ON  | ON  | OFF | ON  | ON  | OFF |
| 25 | OFF | OFF | OFF | ON  | ON  | OFF | OFF | ON  | 55 | OFF | OFF | ON  | ON  | OFF | ON  | ON  | ON  |
| 26 | OFF | OFF | OFF | ON  | ON  | OFF | ON  | OFF | 56 | OFF | OFF | ON  | ON  | ON  | OFF | OFF | OFF |
| 27 | OFF | OFF | OFF | ON  | ON  | OFF | ON  | ON  | 57 | OFF | OFF | ON  | ON  | ON  | OFF | OFF | ON  |
| 28 | OFF | OFF | OFF | ON  | ON  | ON  | OFF | OFF | 58 | OFF | OFF | ON  | ON  | ON  | OFF | ON  | OFF |
| 29 | OFF | OFF | OFF | ON  | ON  | ON  | OFF | ON  | 59 | OFF | OFF | ON  | ON  | ON  | OFF | ON  | ON  |
| 30 | OFF | OFF | OFF | ON  | ON  | ON  | ON  | OFF | 60 | OFF | OFF | ON  | ON  | ON  | ON  | OFF | OFF |

|     | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 61  | OFF | OFF | ON  | ON  | ON  | ON  | OFF | ON  |
| 62  | OFF | OFF | ON  | ON  | ON  | ON  | ON  | OFF |
| 63  | OFF | OFF | ON  | ON  | ON  | ON  | ON  | ON  |
| 64  | OFF | ON  | OFF | OFF | OFF | OFF | OFF | OFF |
| 65  | OFF | ON  | OFF | OFF | OFF | OFF | OFF | ON  |
| 66  | OFF | ON  | OFF | OFF | OFF | OFF | ON  | OFF |
| 67  | OFF | ON  | OFF | OFF | OFF | OFF | ON  | ON  |
| 68  | OFF | ON  | OFF | OFF | OFF | ON  | OFF | OFF |
| 69  | OFF | ON  | OFF | OFF | OFF | ON  | OFF | ON  |
| 70  | OFF | ON  | OFF | OFF | OFF | ON  | ON  | OFF |
| 71  | OFF | ON  | OFF | OFF | OFF | ON  | ON  | ON  |
| 72  | OFF | ON  | OFF | OFF | ON  | OFF | OFF | OFF |
| 73  | OFF | ON  | OFF | OFF | ON  | OFF | OFF | ON  |
| 74  | OFF | ON  | OFF | OFF | ON  | OFF | ON  | OFF |
| 75  | OFF | ON  | OFF | OFF | ON  | OFF | ON  | ON  |
| 76  | OFF | ON  | OFF | OFF | ON  | ON  | OFF | OFF |
| 77  | OFF | ON  | OFF | OFF | ON  | ON  | OFF | ON  |
| 78  | OFF | ON  | OFF | OFF | ON  | ON  | ON  | OFF |
| 79  | OFF | ON  | OFF | OFF | ON  | ON  | ON  | ON  |
| 80  | OFF | ON  | OFF | ON  | OFF | OFF | OFF | OFF |
| 81  | OFF | ON  | OFF | ON  | OFF | OFF | OFF | ON  |
| 82  | OFF | ON  | OFF | ON  | OFF | OFF | ON  | OFF |
| 83  | OFF | ON  | OFF | ON  | OFF | OFF | ON  | ON  |
| 84  | OFF | ON  | OFF | ON  | OFF | ON  | OFF | OFF |
| 85  | OFF | ON  | OFF | ON  | OFF | ON  | OFF | ON  |
| 86  | OFF | ON  | OFF | ON  | OFF | ON  | ON  | OFF |
| 87  | OFF | ON  | OFF | ON  | OFF | ON  | ON  | ON  |
| 88  | OFF | ON  | OFF | ON  | ON  | OFF | OFF | OFF |
| 89  | OFF | ON  | OFF | ON  | ON  | OFF | OFF | ON  |
| 90  | OFF | ON  | OFF | ON  | ON  | OFF | ON  | OFF |
| 91  | OFF | ON  | OFF | ON  | ON  | OFF | ON  | ON  |
| 92  | OFF | ON  | OFF | ON  | ON  | ON  | OFF | OFF |
| 93  | OFF | ON  | OFF | ON  | ON  | ON  | OFF | ON  |
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| 95  | OFF | ON  | OFF | ON  | ON  | ON  | ON  | ON  |
| 96  | OFF | ON  | ON  | OFF | OFF | OFF | OFF | OFF |
| 97  | OFF | ON  | ON  | OFF | OFF | OFF | OFF | ON  |
| 98  | OFF | ON  | ON  | OFF | OFF | OFF | ON  | OFF |
| 99  | OFF | ON  | ON  | OFF | OFF | OFF | ON  | ON  |
| 100 | OFF | ON  | ON  | OFF | OFF | ON  | OFF | OFF |
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| 102 | OFF | ON  | ON  | OFF | OFF | ON  | ON  | OFF |
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| 106 | OFF | ON  | ON  | OFF | ON  | OFF | ON  | OFF |
| 107 | OFF | ON  | ON  | OFF | ON  | OFF | ON  | ON  |
| 108 | OFF | ON  | ON  | OFF | ON  | ON  | OFF | OFF |
| 109 | OFF | ON  | ON  | OFF | ON  | ON  | OFF | ON  |
| 110 | OFF | ON  | ON  | OFF | ON  | ON  | ON  | OFF |
| 111 | OFF | ON  | ON  | OFF | ON  | ON  | ON  | ON  |
| 112 | OFF | ON  | ON  | ON  | OFF | OFF | OFF | OFF |
| 113 | OFF | ON  | ON  | ON  | OFF | OFF | OFF | ON  |
| 114 | OFF | ON  | ON  | ON  | OFF | OFF | ON  | OFF |
| 115 | OFF | ON  | ON  | ON  | OFF | OFF | ON  | ON  |
| 116 | OFF | ON  | ON  | ON  | OFF | ON  | OFF | OFF |
| 117 | OFF | ON  | ON  | ON  | OFF | ON  | OFF | ON  |
| 118 | OFF | ON  | ON  | ON  | OFF | ON  | ON  | OFF |
| 119 | OFF | ON  | ON  | ON  | OFF | ON  | ON  | ON  |
| 120 | OFF | ON  | ON  | ON  | ON  | OFF | OFF | OFF |
| 121 | OFF | ON  | ON  | ON  | ON  | OFF | OFF | ON  |
| 122 | OFF | ON  | ON  | ON  | ON  | OFF | ON  | OFF |
| 123 | OFF | ON  | ON  | ON  | ON  | ON  | OFF | ON  |
| 124 | OFF | ON  | ON  | ON  | ON  | ON  | OFF | OFF |
| 125 | OFF | ON  | ON  | ON  | ON  | ON  | OFF | ON  |
| 126 | OFF | ON  | ON  | ON  | ON  | ON  | ON  | OFF |
| 127 | OFF | ON  | ON  | ON  | ON  | ON  | ON  | ON  |
| 128 | ON  | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| 129 | ON  | OFF | OFF | OFF | OFF | OFF | OFF | ON  |
| 130 | ON  | OFF | OFF | OFF | OFF | OFF | ON  | OFF |
| 131 | ON  | OFF | OFF | OFF | OFF | OFF | ON  | ON  |
| 132 | ON  | OFF | OFF | OFF | OFF | ON  | OFF | OFF |
| 133 | ON  | OFF | OFF | OFF | OFF | ON  | OFF | ON  |
| 134 | ON  | OFF | OFF | OFF | OFF | ON  | ON  | OFF |
| 135 | ON  | OFF | OFF | OFF | OFF | ON  | ON  | ON  |
| 136 | ON  | OFF | OFF | OFF | ON  | OFF | OFF | OFF |

|     | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 137 | ON  | OFF | OFF | OFF | ON  | OFF | OFF | ON  |
| 138 | ON  | OFF | OFF | OFF | ON  | OFF | ON  | OFF |
| 139 | ON  | OFF | OFF | OFF | ON  | OFF | ON  | ON  |
| 140 | ON  | OFF | OFF | OFF | ON  | ON  | OFF | OFF |
| 141 | ON  | OFF | OFF | OFF | ON  | ON  | OFF | ON  |
| 142 | ON  | OFF | OFF | OFF | ON  | ON  | ON  | OFF |
| 143 | ON  | OFF | OFF | OFF | ON  | ON  | ON  | ON  |
| 144 | ON  | OFF | OFF | ON  | OFF | OFF | OFF | OFF |
| 145 | ON  | OFF | OFF | ON  | OFF | OFF | OFF | ON  |
| 146 | ON  | OFF | OFF | ON  | OFF | OFF | ON  | OFF |
| 147 | ON  | OFF | OFF | ON  | OFF | OFF | ON  | ON  |
| 148 | ON  | OFF | OFF | ON  | OFF | ON  | OFF | OFF |
| 149 | ON  | OFF | OFF | ON  | OFF | ON  | OFF | ON  |
| 150 | ON  | OFF | OFF | ON  | OFF | ON  | ON  | OFF |
| 151 | ON  | OFF | OFF | ON  | OFF | ON  | ON  | ON  |
| 152 | ON  | OFF | OFF | ON  | ON  | OFF | OFF | OFF |
| 153 | ON  | OFF | OFF | ON  | ON  | OFF | OFF | ON  |
| 154 | ON  | OFF | OFF | ON  | ON  | OFF | ON  | OFF |
| 155 | ON  | OFF | OFF | ON  | ON  | OFF | ON  | ON  |
| 156 | ON  | OFF | OFF | ON  | ON  | ON  | OFF | OFF |
| 157 | ON  | OFF | OFF | ON  | ON  | ON  | OFF | ON  |
| 158 | ON  | OFF | OFF | ON  | ON  | ON  | ON  | OFF |
| 159 | ON  | OFF | OFF | ON  | ON  | ON  | ON  | ON  |
| 160 | ON  | OFF | ON  | OFF | OFF | OFF | OFF | OFF |
| 161 | ON  | OFF | ON  | OFF | OFF | OFF | OFF | ON  |
| 162 | ON  | OFF | ON  | OFF | OFF | OFF | ON  | OFF |
| 163 | ON  | OFF | ON  | OFF | OFF | OFF | ON  | ON  |
| 164 | ON  | OFF | ON  | OFF | OFF | ON  | OFF | OFF |
| 165 | ON  | OFF | ON  | OFF | OFF | ON  | OFF | ON  |
| 166 | ON  | OFF | ON  | OFF | OFF | ON  | ON  | OFF |
| 167 | ON  | OFF | ON  | OFF | OFF | ON  | ON  | ON  |
| 168 | ON  | OFF | ON  | OFF | ON  | OFF | OFF | OFF |
| 169 | ON  | OFF | ON  | OFF | ON  | OFF | OFF | ON  |
| 170 | ON  | OFF | ON  | OFF | ON  | OFF | ON  | OFF |
| 171 | ON  | OFF | ON  | OFF | ON  | OFF | ON  | ON  |
| 172 | ON  | OFF | ON  | OFF | ON  | ON  | OFF | OFF |
| 173 | ON  | OFF | ON  | OFF | ON  | ON  | OFF | ON  |
| 174 | ON  | OFF | ON  | OFF | ON  | ON  | ON  | OFF |
| 175 | ON  | OFF | ON  | OFF | ON  | ON  | ON  | ON  |
| 176 | ON  | OFF | ON  | ON  | OFF | OFF | OFF | OFF |
| 177 | ON  | OFF | ON  | ON  | OFF | OFF | OFF | ON  |
| 178 | ON  | OFF | ON  | ON  | OFF | OFF | ON  | OFF |
| 179 | ON  | OFF | ON  | ON  | OFF | OFF | ON  | ON  |
| 180 | ON  | OFF | ON  | ON  | OFF | ON  | OFF | OFF |
| 181 | ON  | OFF | ON  | ON  | OFF | ON  | OFF | ON  |
| 182 | ON  | OFF | ON  | ON  | OFF | ON  | ON  | OFF |
| 183 | ON  | OFF | ON  | ON  | OFF | ON  | ON  | ON  |
| 184 | ON  | OFF | ON  | ON  | ON  | OFF | OFF | OFF |
| 185 | ON  | OFF | ON  | ON  | ON  | OFF | OFF | ON  |
| 186 | ON  | OFF | ON  | ON  | ON  | OFF | ON  | OFF |
| 187 | ON  | OFF | ON  | ON  | ON  | OFF | ON  | ON  |
| 188 | ON  | OFF | ON  | ON  | ON  | ON  | OFF | OFF |
| 189 | ON  | OFF | ON  | ON  | ON  | ON  | OFF | ON  |
| 190 | ON  | OFF | ON  | ON  | ON  | ON  | ON  | OFF |
| 191 | ON  | OFF | ON  | ON  | ON  | ON  | ON  | ON  |
| 192 | ON  | ON  | OFF | OFF | OFF | OFF | OFF | OFF |
| 193 | ON  | ON  | OFF | OFF | OFF | OFF | OFF | ON  |
| 194 | ON  | ON  | OFF | OFF | OFF | OFF | ON  | OFF |
| 195 | ON  | ON  | OFF | OFF | OFF | OFF | ON  | ON  |
| 196 | ON  | ON  | OFF | OFF | OFF | ON  | OFF | OFF |
| 197 | ON  | ON  | OFF | OFF | OFF | ON  | OFF | ON  |
| 198 | ON  | ON  | OFF | OFF | OFF | ON  | ON  | OFF |
| 199 | ON  | ON  | OFF | OFF | OFF | ON  | ON  | ON  |
| 200 | ON  | ON  | OFF | OFF | ON  | OFF | OFF | OFF |
| 201 | ON  | ON  | OFF | OFF | ON  | OFF | OFF | ON  |
| 202 | ON  | ON  | OFF | OFF | ON  | OFF | ON  | OFF |
| 203 | ON  | ON  | OFF | OFF | ON  | OFF | ON  | ON  |
| 204 | ON  | ON  | OFF | OFF | ON  | ON  | OFF | OFF |
| 205 | ON  | ON  | OFF | OFF | ON  | ON  | OFF | ON  |
| 206 | ON  | ON  | OFF | OFF | ON  | ON  | ON  | OFF |
| 207 | ON  | ON  | OFF | OFF | ON  | ON  | ON  | ON  |
| 208 | ON  | ON  | OFF | ON  | OFF | OFF | OFF | OFF |
| 209 | ON  | ON  | OFF | ON  | OFF | OFF | OFF | ON  |
| 210 | ON  | ON  | OFF | ON  | OFF | OFF | ON  | OFF |
| 211 | ON  | ON  | OFF | ON  | OFF | OFF | ON  | ON  |
| 212 | ON  | ON  | OFF | ON  | OFF | ON  | OFF | OFF |

|     | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 213 | ON  | ON  | OFF | ON  | OFF | ON  | OFF | ON  |
| 214 | ON  | ON  | OFF | ON  | OFF | ON  | ON  | OFF |
| 215 | ON  | ON  | OFF | ON  | OFF | ON  | ON  | ON  |
| 216 | ON  | ON  | OFF | ON  | ON  | OFF | OFF | OFF |
| 217 | ON  | ON  | OFF | ON  | ON  | OFF | OFF | ON  |
| 218 | ON  | ON  | OFF | ON  | ON  | OFF | ON  | OFF |
| 219 | ON  | ON  | OFF | ON  | ON  | OFF | ON  | ON  |
| 220 | ON  | ON  | OFF | ON  | ON  | ON  | OFF | OFF |
| 221 | ON  | ON  | OFF | ON  | ON  | ON  | OFF | ON  |
| 222 | ON  | ON  | OFF | ON  | ON  | ON  | ON  | OFF |
| 223 | ON  | ON  | OFF | ON  | ON  | ON  | ON  | ON  |
| 224 | ON  | ON  | ON  | OFF | OFF | OFF | OFF | OFF |
| 225 | ON  | ON  | ON  | OFF | OFF | OFF | OFF | ON  |
| 226 | ON  | ON  | ON  | OFF | OFF | OFF | ON  | OFF |
| 227 | ON  | ON  | ON  | OFF | OFF | OFF | ON  | ON  |
| 228 | ON  | ON  | ON  | OFF | OFF | ON  | OFF | OFF |
| 229 | ON  | ON  | ON  | OFF | OFF | ON  | OFF | ON  |
| 230 | ON  | ON  | ON  | OFF | OFF | ON  | ON  | OFF |

|     | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 231 | ON  | ON  | ON  | OFF | OFF | ON  | ON  | ON  |
| 232 | ON  | ON  | ON  | OFF | ON  | OFF | OFF | OFF |
| 233 | ON  | ON  | ON  | OFF | ON  | OFF | OFF | ON  |
| 234 | ON  | ON  | ON  | OFF | ON  | OFF | ON  | OFF |
| 235 | ON  | ON  | ON  | OFF | ON  | OFF | ON  | ON  |
| 236 | ON  | ON  | ON  | OFF | ON  | ON  | OFF | OFF |
| 237 | ON  | ON  | ON  | OFF | ON  | ON  | OFF | ON  |
| 238 | ON  | ON  | ON  | OFF | ON  | ON  | ON  | OFF |
| 239 | ON  | ON  | ON  | OFF | ON  | ON  | ON  | ON  |
| 240 | ON  | ON  | ON  | ON  | OFF | OFF | OFF | OFF |
| 241 | ON  | ON  | ON  | ON  | OFF | OFF | OFF | ON  |
| 242 | ON  | ON  | ON  | ON  | OFF | OFF | ON  | OFF |
| 243 | ON  | ON  | ON  | ON  | OFF | OFF | ON  | ON  |
| 244 | ON  | ON  | ON  | ON  | OFF | ON  | OFF | OFF |
| 245 | ON  | ON  | ON  | ON  | OFF | ON  | OFF | ON  |
| 246 | ON  | ON  | ON  | ON  | OFF | ON  | ON  | OFF |
| 247 | ON  | ON  | ON  | ON  | OFF | ON  | ON  | ON  |

Tab. 3.c

Una volta impostato il sistema ed il supervisore è attivo, lo stato della comunicazione viene visualizzato da L1 ed L2.

Si veda la tabella relativa allo stato dei LED per maggiori dettagli.

Una funzione di diagnostica di errore delle comunicazioni seriale è prevista all'interno dello strumento

## 3.4 Calibrazione dello strumento

Sono previsti più metodi di calibrazione dello strumento di seguito si descrivono i principali.

### CALIBRAZIONE AUTOMATICA CO2

La minima concentrazione di CO2 in un ambiente esterno pulito e poco industrializzato è approssimativamente di 350ppm. Lo scambio del gas nell'elemento sensore avviene per diffusione. A seconda di una variazione della concentrazione e alla velocità del flusso dell'aria che circonda il sensore, la reazione del dispositivo al cambiamento di concentrazione può richiedere un po' di tempo. È essenziale scegliere un luogo di installazione per il dispositivo ben aerato.

La calibrazione automatica prevista dallo strumento è un meccanismo adatto per l'uso in applicazioni in cui la concentrazione di CO2 scende al valore di fondo del livello dell'aria (350 - 400 ppm) almeno tre volte in 7 giorni. Ciò dovrebbe verificarsi in genere durante i periodi in cui le stanze non sono occupate.

Gli errori di deviazione rimangono comunque minimi se il sensore viene esposto all'aria fresca almeno 4 volte entro 21 giorni.

Il dispositivo raggiunge la corretta misura dopo 24 ore di funzionamento continuo.

### CALIBRAZIONE MANUALE CO2 STRUMENTO VERSIONE A PARETE (condotta da provare)

Il sensore prevede una funzione di calibrazione automatica periodica. Nel caso in cui non ci fosse sufficiente aereazione dove è montato lo strumento si consiglia di eseguire periodicamente le calibrazioni manuali. Per procedere con la calibrazione manuale si proceda nel seguente modo:

1. Procedere con l'aerazione dell'area dove è montato lo strumento. La concentrazione di CO2 dovrebbe essere inferiore a 500ppm, prima durante e subito dopo la procedura di calibrazione.
2. La procedura di calibrazione si attiva premendo il tasto T1 il LED L3 inizia lampeggiare, nella versione di prodotto con display compare la scritta in basso "AUTO 0" e il carattere C sulla destra del display.

Tenere premuto il tasto fino a quando L3 rimane sempre acceso, nella versione con display, compare un contatore con la scritta in basso "CALO" e il carattere C sulla destra del display. Attendere 10 minuti perché la procedura venga terminata. In questa fase si consiglia di allontanarsi dallo strumento per ridurre al minimo il valore di CO2.

### CALIBRAZIONE AUTOMATICA VOC

La calibrazione automatica del VOC funziona correttamente se il sensore viene installato in un'area in cui c'è una completa aereazione per almeno 20 minuti ogni settimana.

In questo modo dopo un periodo di 3 settimane viene salvato il valore minimo per la qualità dell'aria. Questo meccanismo oltre a permettere una misura accurata elimina gli errori di misura a lungo termine dovuti all'invecchiamento del sensore.

### CALIBRAZIONE MANUALE VOC STRUMENTO VERSIONE A PARETE (condotta da provare)

Il sensore prevede una funzione di calibrazione automatica periodica. Nel caso in cui non ci fosse sufficiente aereazione dove è montato lo strumento si consiglia di eseguire periodicamente le calibrazioni manuali. Per procedere con la calibrazione manuale si proceda nel seguente modo:

1. Procedere con l'aerazione dell'area dove è montato lo strumento in modo che la concentrazione di VOC scenda quanto più possibile, prima durante e subito dopo la procedura di calibrazione.
2. La procedura di calibrazione si attiva premendo il tasto T2 il LED L4 inizia lampeggiare, nella versione di prodotto con display compare la scritta in basso "AUTO 0" e il carattere V sulla destra del display.



Tenere premuto il tasto fino a quando L4 rimane sempre acceso, nella versione con display, compare un contatore con la scritta in basso "CALO" e il carattere V sulla destra del display. Attendere 60 secondi perché la procedura venga terminata.

### Significato dello stato dei LED

| LED | lampeggiante                            | Sempre acceso             | Sempre spento           |
|-----|---|---------------------------|-------------------------|
| L1  | Seriale funzionante                     | -                         | Seriale non funzionante |
| L2  | Seriale connessa allo strumento         | -                         | Funzionamento standard  |
| L3  | T1 premuto per avviare calibrazione CO2 | Calibrazione CO2 in corso | Funzionamento standard  |
| L4  | T2 premuto per avviare calibrazione VOC | Calibrazione VOC in corso | Funzionamento standard  |

Tab. 3.d

## 3.5 Collegamento alla rete RS485 di supervisione, installazione tipica

Lo strumento di misura IAQ per poter funzionare correttamente ha bisogno di essere collegato, tramite seriale ad un supervisore che può essere un pCO oppure un super visore della famiglia BOSS. Di seguito si riportano alcune installazioni tipiche, per la versione parete e a condotta, di collegamento tra i sensori IAQ ed il sistema Carel.

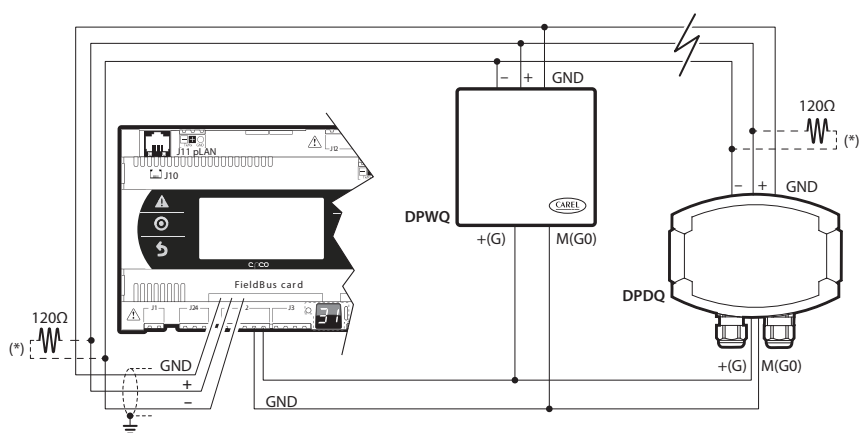


Fig. 3.g

(\*) : Si noti che le resistenze di terminazione sono inserite sul primo strumento (tipicamente il pCO) e sull'ultimo strumento. Nel caso sia l'IAQ, non è necessario inserirla esternamente, ma si seleziona questa modalità da DIP 1

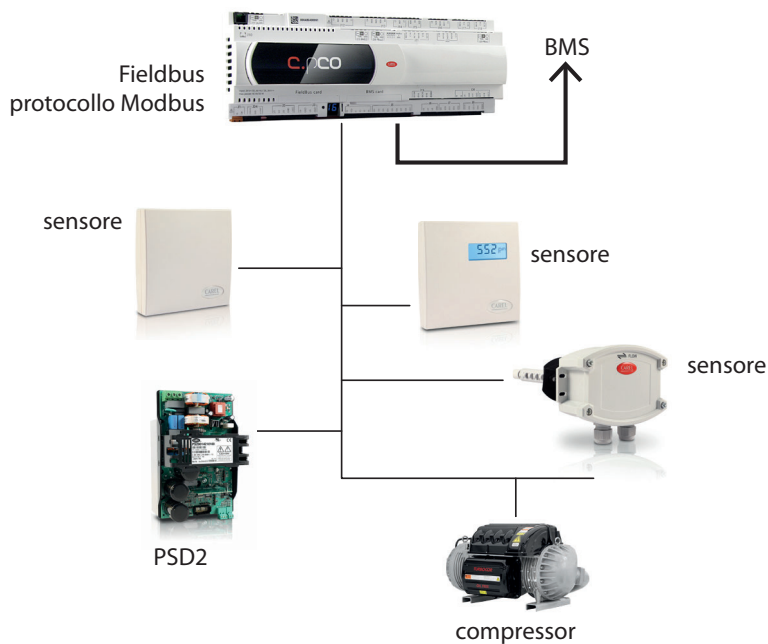


Fig. 3.h

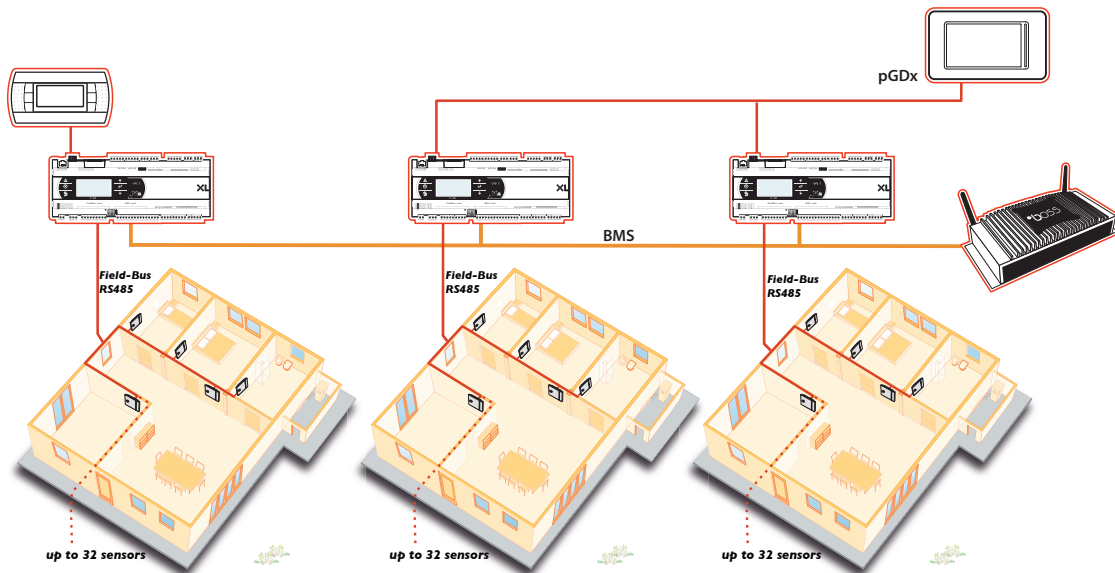


Fig. 3.i

### Configurazione 1: stesso alimentatore per tutti gli strumenti

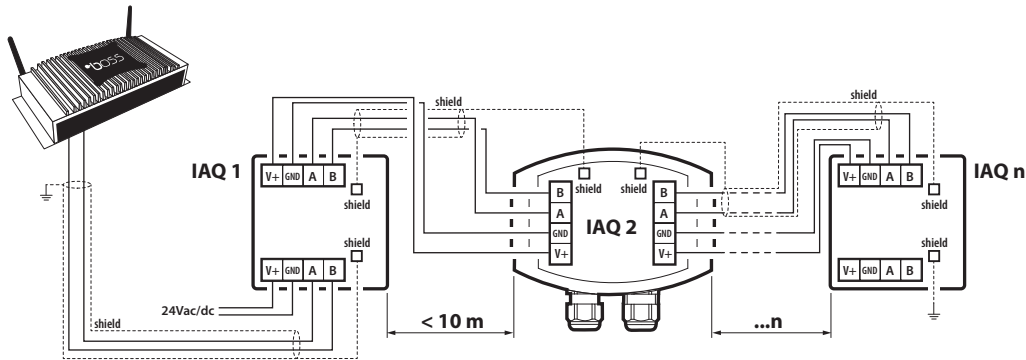


Fig. 3.j

- L'alimentazione va dimensionata a seconda del numero di sonde collegate.
- E' possibile il collegamento di terra anche sui nodi intermedi per migliorare ulteriormente l'immunità del prodotto ad eventuali disturbi.
- Se il nodo N, è l'ultimo nodo della rete, come riportato nella fig. sopra, abilitare tramite il dip switch la resistenza 120 ohm.
- Questa configurazione è valida solo nel caso in cui tutte le distanze massime tra un IAQ ed un altro sia inferiore a 10 m.
- I collegamenti evidenziati sono validi sia per sonde ambiente che sonde a condotta.

### Configurazione 2: Un alimentatore per ogni strumento

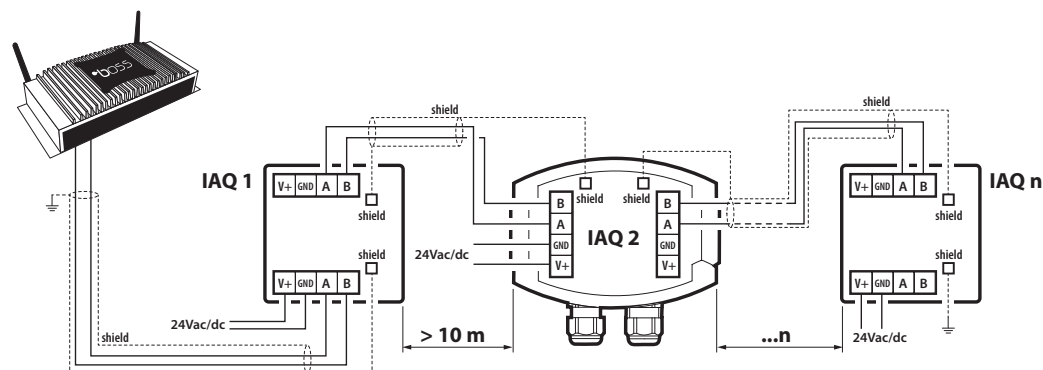


Fig. 3.k

Configurazione 3: Seriale e alimentazione collegate sullo stesso connettore

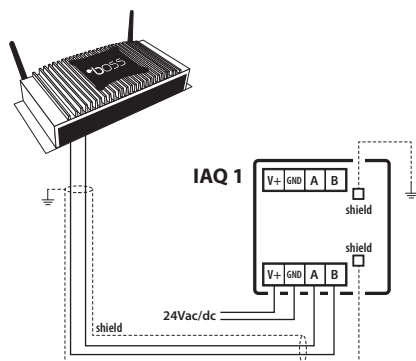


Fig. 3.l

Configurazione 4: Seriale collegata su un connettore, alimentazione sull'altro connettore

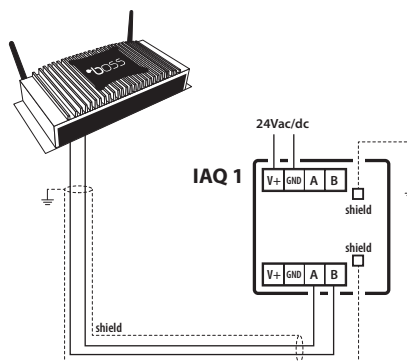


Fig. 3.m

### 3.6 Tabella Variabili-Parametri principali per sonde seriali

È possibile accedere ai parametri via linea seriale utilizzando il protocollo Modbus. In seguito la tabella e variabili di stato:

Tabella variabili versione di prodotto a parete

**Function 04 Read Input Register**

| Register | Variable description                 | Data Type       | Default | Saved value | Min. value | Max. value | Min. range | Max. range |
|----------|--------------------------------------|-----------------|---------|-------------|------------|------------|------------|------------|
| 3x0001   | CO2 Value Sampling 4s                | Signed 16 Bit   | -       | -           | 350        | 5000       | 350        | 5000       |
| 3x0002   | CO2 Value Sampling 32s               | Signed 16 Bit   | -       | -           | 350        | 5000       | 350        | 5000       |
| 3x0003   | VOC Value Sampling 4s                | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0004   | VOC Value Sampling 32s               | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0005   | Temperature Value Sampling 4s        | Signed 16 Bit   | -       | -           | 0          | 500        | 0          | 50C        |
| 3x0006   | Temperature Value Sampling 32s       | Signed 16 Bit   | -       | -           | 0          | 500        | 0          | 50C        |
| 3x0007   | Relative humidity Value Sampling 4s  | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0008   | Relative humidity Value Sampling 32s | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0009   | RESERVED                             | -               | -       | -           | -          | -          | -          | -          |
| 3x0010   | RESERVED                             | -               | -       | -           | -          | -          | -          | -          |
| 3x0011   | RESERVED                             | -               | -       | -           | -          | -          | -          | -          |
| 3x0012   | VOC Value Sampling 4s                | Unsigned 16 bit | -       | -           | 0          | 60000      | 0          | 60000 ppb  |
| 3x0013   | VOC Value Sampling 32s               | Unsigned 16 bit | -       | -           | 0          | 60000      | 0          | 60000 ppb  |
| 3x0014   | Particles Value Sampling 4s          | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 1000 µg/m3 |
| 3x0015   | Particles Value Sampling 32s         | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 1000 µg/m3 |

**Function 05 Write Single Coil <sup>(1)</sup>**

| Register | Variable description         | Data Type | Default | Saved value | Min. Value | Max. value | Min. range | Max. range |
|----------|------------------------------|-----------|---------|-------------|------------|------------|------------|------------|
| 0x0001   | Reset (Auto zero) CO2        | Bit 0     | 0       | NO          | 0          | 1          | OFF        | ON         |
| 0x0002   | Reset (Auto zero) VOC        | Bit 1     | 0       | NO          | 0          | 1          | OFF        | ON         |
| 0x0003   | Automatic calibration CO2    | Bit 2     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0004   | RESERVED                     | Bit 3     | -       | -           | 0          | 1          | OFF        | ON         |
| 0x0005   | VOC sensibility low          | Bit 4     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0006   | VOC sensibility medium       | Bit 5     | 1       | YES         | 0          | 1          | OFF        | ON         |
| 0x0007   | VOC sensibility high         | Bit 6     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0008   | LCD BACKLIGHT                | Bit 7     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0009   | temperature measurement type | Bit 8     | 0       | YES         | 0          | 1          | °C         | °F         |
| 0x0010   | Particle size measurement    | Bit 9     | 1       | YES         | 0          | 1          | PM 2,5     | PM 10      |

**Function 06 Write Single Register & Function 16 Write Multiple Register <sup>(1)</sup>**

| Register | Variable description   | Data Type      | Default | Saved value | Min. Value | Max. value | Min. range       | Max. range    |
|----------|--|----------------|---------|-------------|------------|------------|------------------|---------------|
| 4x0001   | Physical parameter displayed   | Unsigned 8 bit | 0       | YES         | 0          | 10         | 0                | 10            |
|          | Standard display (cyclic):<br>VOC in %, CO2 in ppm, temperature in °C,<br>relative humidity in % r.H., particulate matter<br>(PM) in µg/m3 | -              | -       | -           | 0          | 0          | Def.<br>Settings | Def. Settings |
|          | Display fixed to CO2 in ppm  | -              | -       | -           | 1          | 1          | 1                | 1             |
|          | Display fixed to VOC in %  | -              | -       | -           | 2          | 2          | 2                | 2             |
|          | Display fixed to Temperature   | -              | -       | -           | 3          | 3          | 3                | 3             |
|          | Display fixed to Relative humidity in % r.H.   | -              | -       | -           | 4          | 4          | 4                | 4             |
|          | Display fixed to Particulate matter (PM) in µg/m   | -              | -       | -           | 6          | 6          | 6                | 6             |
|          | Freely configurable display – 10   | -              | -       | -           |            |            |                  |               |
| 4x0002   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0003   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0004   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0005   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0006   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0007   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0008   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0009   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0010   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0011   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0012   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0020   | Brightness LCD-backlighting  | Unsigned 8 Bit | 100     | YES         | 0          | 63         | 0                | 100%          |
| 4x0021   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0022   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0023   | Offset Temperature   | Signed 10 Bit  | 0       | YES         | -100       | 100        | -10K             | +10K          |
| 4x0024   | Offset Humidity  | Signed 10 Bit  | 0       | YES         | -100       | 100        | -10%             | +10%          |

**Function 08 Diagnostics**

| Sub Function Code | Parameter  | Data Type       | ANSWER                         |
|-------------------|--|-----------------|--------------------------------|
| 00                | Echo of transmission data (Loopback)                       |                 | Echo data                      |
| 01                | Restart Modbus (Reset listen-only mode)                    |                 | Echo message                   |
| 04                | Activation listen-only mode                                |                 | No answer                      |
| 10                | Delete counter   |                 | Echo telegram                  |
| 11                | Counter bus telegrams                                      | Unsigned 16 bit | All valid bus messages         |
| 12                | ter communication errors (Parity, CRC, frame errors, etc.) | Unsigned 16 bit | Faulty bus messages            |
| 13                | Counter exception messages                                 | Unsigned 16 bit | Error counter                  |
| 14                | Counter slave messages                                     | Unsigned 16 bit | Slave messages                 |
| 15                | Counter messages without answer                            | Unsigned 16 bit | Broadcast messages (address 0) |

**Function 17 Report Slave ID**

| Sub Function Code | Parameter                   | Data Type      | ANSWER  |
|-------------------|-----------------------------|----------------|---|
| 00                | Number of bytes             | Unsigned 8 bit | 6   |
| 01                | Slave ID (device type)      | Unsigned 8 bit | AERSGARD® MODBUS<br>19 = T,H,C<br>20 = T,H<br>T: temperature<br>H: relative humidity<br>C: carbon dioxide (CO2) |
| 02                | Slave ID (device class)     | Unsigned 8 bit | 60 = AERASGARD® / AERASREG®   |
| 03                | 03 Status                   | Unsigned 8 bit | 255 = RUN, 0 = STOP   |
| 04                | 04 Version number (release) | Unsigned 8 bit | 1...9   |
| 05                | 05 Version number (version) | Unsigned 8 bit | 1...99  |
| 06                | 06 Version number (index)   | Unsigned 8 bit | 1   |

Tab. 3.e

## Tabella variabili versione di prodotto a condotta

### Function 04 Read Input Register

| Register | Variable description                 | Data Type     | Default | Saved value | Min. Value | Max. value | Min. range | Max. range |
|----------|--------------------------------------|---------------|---------|-------------|------------|------------|------------|------------|
| 3x0001   | CO2 Value Sampling 4s                | Signed 16 Bit | -       | -           | 350        | 5000       | 350        | 5000       |
| 3x0002   | CO2 Value Sampling 32s               | Signed 16 Bit | -       | -           | 350        | 5000       | 350        | 5000       |
| 3x0003   | RESERVED                             |               | -       | -           |            |            |            |            |
| 3x0004   | RESERVED                             |               | -       | -           |            |            |            |            |
| 3x0005   | Temperature Value Sampling 4s        | Signed 16 Bit | -       | -           | -350       | 800        | -35C       | +80C       |
| 3x0006   | Temperature Value Sampling 32s       | Signed 16 Bit | -       | -           | -350       | 800        | -35C       | +80C       |
| 3x0007   | Relative humidity Value Sampling 4s  | Signed 16 Bit | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0008   | Relative humidity Value Sampling 32s | Signed 16 Bit | -       | -           | 0          | 1000       | 0          | 100%       |

### Function 05 Write Single Coil <sup>(1)</sup>

| Register | Variable description         | Data Type | Default | Saved value | Min. Value | Max. value | Min. range | Max. range |
|----------|------------------------------|-----------|---------|-------------|------------|------------|------------|------------|
| 0x0001   | Reset (Auto zero) CO2        | Bit 0     | 0       | NO          | 0          | 1          | OFF        | ON         |
| 0x0002   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0003   | Automatic calibration CO2    | Bit 2     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0004   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0005   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0006   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0007   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0008   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0009   | temperature measurement type | Bit 8     | 0       | YES         | 0          | 1          | °C         | °F         |

### Function 06 Write Single Register & Function 16 Write Multiple Register <sup>(1)</sup>

| Register | Variable description | Data Type     | Default | Saved value | Min. Value | Max. value | Min. range | Max. range |
|----------|----------------------|---------------|---------|-------------|------------|------------|------------|------------|
| 4x0023   | Offset Temperature   | Signed 10 Bit | 0       | YES         | -100       | 100        | -10K       | +10K       |
| 4x0024   | Offset Humidity      | Signed 10 Bit | 0       | YES         | -100       | 100        | -10%       | +10%       |

### Function 08 Diagnostics

| Sub Function Code | Parameter  | Data Type       | ANSWER                         |
|-------------------|--|-----------------|--------------------------------|
| 00                | Echo of transmission data (Loopback)                           |                 | Echo data                      |
| 01                | Restart Modbus (Reset listen-only mode)                        |                 | Echo message                   |
| 04                | Activation listen-only mode                                    |                 | No answer                      |
| 10                | Delete counter   |                 | Echo telegram                  |
| 11                | Counter bus telegrams  | Unsigned 16 bit | All valid bus messages         |
| 12                | Counter communication errors (Parity, CRC, frame errors, etc.) | Unsigned 16 bit | Faulty bus messages            |
| 13                | Counter exception messages                                     | Unsigned 16 bit | Error counter                  |
| 14                | Counter slave messages   | Unsigned 16 bit | Slave messages                 |
| 15                | Counter messages without answer                                | Unsigned 16 bit | Broadcast messages (address 0) |

### Function 17 Report Slave ID

| Sub Function Code | Parameter                   | Data Type      | ANSWER  |
|-------------------|-----------------------------|----------------|---|
| 00                | Number of bytes             | Unsigned 8 bit | 6   |
| 01                | Slave ID (device type)      | Unsigned 8 bit | AERSGARD® MODBUS<br>17 = T,H,V,P,C<br>18 = T,H,V,C<br>19 = T,H,C<br>20 = T,H<br>21 = T,H,P<br>T: temperature<br>H: relative humidity<br>V: air quality (VOC)<br>P: particulate matter (PM)<br>C: carbon dioxide (CO2) |
| 02                | Slave ID (device class)     | Unsigned 8 bit | 60 = AERASGARD® / AERASREG®   |
| 03                | 03 Status                   | Unsigned 8 bit | 255 = RUN, 0 = STOP   |
| 04                | 04 Version number (release) | Unsigned 8 bit | 1...9   |
| 05                | 05 Version number (version) | Unsigned 8 bit | 1...99  |
| 06                | 06 Version number (index)   | Unsigned 8 bit | 1   |

Tab. 3.f

<sup>(1)</sup>: variabili di tipo "sola scrittura", che attraverso i sistemi di supervisione Modbus possono essere impostate al valore desiderato ma non è possibile leggerne il loro valore. Nei supervisor CAREL queste variabili vengono visualizzate di conseguenza nel campo "valore" con i simboli di "\*\*\*\*", salvo nel caso in cui vengono impostate ad un determinato nuovo valore. In questi casi il campo "valore" indica, fino al prossimo riavvio, il numero inviato in programmazione alla sonda.

### 3.7 Tabella compatibilità chimica per l'elemento sensibile

Gli elementi sensibili sono stati sottoposti a test di compatibilità.

| Chemical Load                             | %RH    | T      |
|---|--------|--------|
| Diesel                                    | OK (1) | OK (1) |
| Biodiesel                                 | OK     | OK     |
| Ethanol(pure)                             | OK     | OK     |
| Isopropanol                               | OK     | OK     |
| Cockpit spray                             | OK     | OK     |
| Protective lacquer                        | OK     | OK     |
| Protective lacquer remover                | OK     | OK     |
| Refreshment containing caffeine and sugar | OK     | OK     |
| Cold cleaning agent                       | OK     | OK     |
| Spiritus                                  | OK     | OK     |
| Car wash cleaner                          | OK     | OK     |
| Glass cleaner                             | OK     | OK     |
| Interior cleaner                          | OK     | OK     |
| Salt water                                | OK     | OK     |

Tab. 3.g

☛ Nota (1): ok a 25°C, alcune caratteristiche estetiche possono modificarsi se utilizzata questa sostanza in tutto il range di temperatura.

### 3.8 Caratteristiche tecniche

| Caratteristiche elettriche | Versione a muro                    | Versione a condotta                 |
|----------------------------|------------------------------------|-------------------------------------|
| Tensione di alimentazione  | 24Vac/Vdc ±10%                     | 24Vac/Vdc ±10%                      |
| Potenza assorbita          | 24Vdc Max. 4,4 W - 24Vac Max 6,4VA | 24Vdc Max. 4,8 W - 24Vac Max. 6,5VA |
| Frequenza di alimentazione | 50/60Hz                            |                                     |
| Classe di protezione       | III (in accordo con EN60730)       |                                     |

La sorgente di alimentazione utilizzata deve essere di tipo SELV/PELV.

Se l'alimentazione ha una potenza superiore a 15W, inserire un fusibile esterno opportunamente dimensionato.

| Caratteristiche sensore di temperatura |   |                     |
|--|---|---------------------|
| Tipo di sensore di temperatura         | Sensore digitale a bassa isteresi, alta stabilità a lungo termine                             |                     |
| Range di funzionamento operativo       | 0-50°C (32-122°F)   | -20-50°C (-4-122°F) |
| Precisione                             | ± 0,2°C 25C (±0,36F 77°F)<br>± 0,8°C (0,44°F) in tutto il range di funzionamento del prodotto |                     |

| Caratteristiche sensore di umidità |   |  |
|------------------------------------|---|--|
| Tipo di sensore di umidità         | Sensore digitale a bassa isteresi, alta stabilità a lungo termine             |  |
| Range di funzionamento operativo   | 0-95 r.H%.  |  |
| Precisione                         | ± 2% r.H. 20-80% 25°C<br>± 5% in tutto il range di funzionamento del prodotto |  |

| Sensore di anidride carbonica (CO2) |   |  |
|-------------------------------------|---|--|
| Tipo di sensore                     | Ottico ad infrarosso con calibrazione manuale ed automatica |  |
| Range di funzionamento operativo    | 0-5000 ppm  |  |
| Precisione                          | ± 3% del valore misurato<br>± 0,5% del valore misurato/C    |  |
| Vita di servizio                    | 15 anni   |  |
| Stabilità del sensore nel tempo     | Massimo 2% in tutta la vita di servizio                     |  |

| Caratteristiche sensore di qualità dell'aria (VOC) disponibile versione a parete |  |  |
|--|--|--|
| Tipo di sensore  | Sensore VOC ad ossido di metallo con calibrazione automatica |  |
| Range di funzionamento operativo   | 0-100% riferito al gas di calibrazione                       |  |
| Precisione   | ± 20% rispetto alla misura                                   |  |
| Vita di servizio   | Maggiore di 5 anni   |  |

| Sensore di particolato (PM) disponibile versione a parete |   |  |
|---|---|--|
| Tipo di sensore   | Ottico laser  |  |
| Range di funzionamento operativo                          | 0-1000 ug/M-3   |  |
| Tipo di particolato                                       | PM 2,5 0,3-2,5ug<br>PM 10 0,3-10ug                                |  |
| Precisione  | ± 10% del valore misurato PM2.5<br>± 25% del valore misurato PM10 |  |
| Vita di servizio  | Maggiore di 10 anni   |  |
| Stabilità del sensore nel tempo                           | ± 1,25% del valore misurato all'anno                              |  |

| <b>Altre caratteristiche</b>          |  |  |
|---------------------------------------|--|--|
| Temperatura di funzionamento          | 0-50C (32-122F)  | -20-50C (-4-122F)  |
| Temperatura di immagazzinamento       | 0-50C (32-122F)  | -20-50C (-4-122F)  |
| Involucro                             | Plastico ABS RAL 9010  | Polyamide PA6  |
| Dimensioni esterne                    | 98 x 98 33mm   | 126 x 90 x 50 mm   |
| Installazione                         | Muro o pannello in posizione verticale, con foro per aereazione sulla parte inferiore. | Da installare sul canale di aereazione di dimensioni adeguate. |
| Livello di protezione del contenitore | IP30   | IP65   |
| Sezione del filo                      | 0,2-1,5mm-2  |  |
| Classe e struttura del software       | A  |  |
| Protocollo di comunicazione           | Modbus con indirizzo sel. DIP SWITCH da 0 a 247  |  |
| Tempo di risposta del sensore         | Inferiore a 2 minuti   |  |
| Tempo di assestamento delle misure    | 1 ora dall'accensione dello strumento  |  |

Tab. 3.h

### 3.8.3 Pulizia e manutenzione

Per la pulizia dello strumento non utilizzare alcool etilico, idrocarburi (benzina), ammoniaca e derivati. È consigliabile usare detergenti neutri ed acqua. Controllare periodicamente le fessure predisposte di aerazione del sensore per verificare che l'aria possa circolare liberamente attraverso le fessure, senza ostruzioni dovute ad impurità o polveri presenti nel sito di installazione.

## 4. INSTALLAZIONE SENSORI DP-TH

### 4.1 Collegamento del sensore con uscita analogica

Di seguito vengono riportati gli schemi delle connessioni alla morsettiera e la posizione dei ponticelli per l'eventuale configurazione dell'uscita universale in tensione o corrente (default).

DPW\*\*\*0\*\*\* Out entrambi  
 DPD\*\*\*0\*\*\* 0...1 V - 4...20 mA - 0.5-1 Vdc  
 DPP\*\*\*0\*\*\*

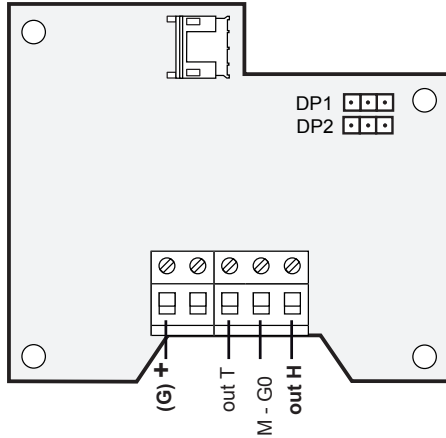


Fig. 4.a

|     |                                     |     |             |                     |
|-----|-------------------------------------|-----|-------------|---------------------|
| DP1 | <input checked="" type="checkbox"/> | ON  | -0.5 to 1 V | } R min.<br>1 kohm  |
| DP2 | <input checked="" type="checkbox"/> | OFF |             |                     |
| DP1 | <input checked="" type="checkbox"/> | ON  | -0 to 1 V   | } R max<br>100 kohm |
| DP2 | <input checked="" type="checkbox"/> | OFF |             |                     |
| DP1 | <input checked="" type="checkbox"/> | ON  | 4 to 20 mA  | } R max<br>100 kohm |
| DP2 | <input checked="" type="checkbox"/> | OFF |             |                     |

DPW\*\*\*1\*\*\* Out NTC Res. per temperatura  
 DPD\*\*\*1\*\*\* 0...1 V - 4...20 mA - 0.5-1 Vdc per umidità  
 DPP\*\*\*1\*\*\*

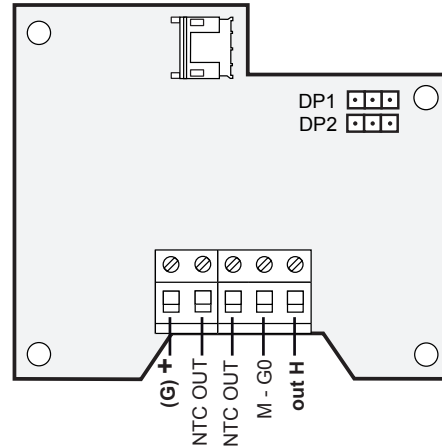


Fig. 4.b

Ponticelli per configurazione uscite:  
 nei modelli con due uscite attive si  
 configurano entrambe nello stesso modo.

DPW\*\*\*2\*\*\* Out entrambi  
 DPD\*\*\*2\*\*\* 0...10 V  
 DPP\*\*\*2\*\*\*

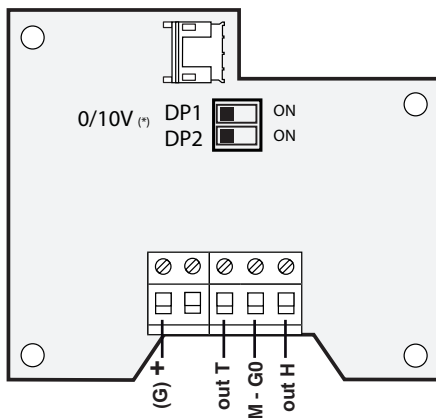


Fig. 4.c

|     |                                     |    |           |                    |
|-----|-------------------------------------|----|-----------|--------------------|
| DP1 | <input checked="" type="checkbox"/> | ON | 0 to 10 V | } R min.<br>1 kohm |
| DP2 | <input checked="" type="checkbox"/> | ON |           |                    |

(\*) Versione 0-10V= configurazione di fabbrica

DPW\*\*\*5\*\*\* Out NTC Res. per temperatura  
 DPD\*\*\*5\*\*\* 0...10 V umidità  
 DPP\*\*\*5\*\*\*

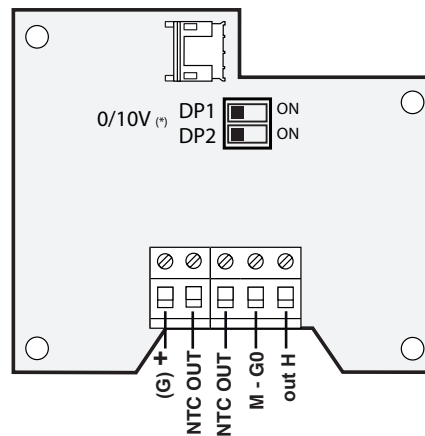


Fig. 4.d

**Legenda:**

|       |   |
|-------|---|
| out T | uscita temperatura -0,5...1 Vdc o 0...1 Vdc o 4...20 mA per modelli (DPxxx0 o 1); |
| out T | uscita temperatura 0...10 Vdc per modelli (DPxxx2 o 5);                           |
| out H | uscita umidità -0,5...1 Vdc o 0...1 Vdc o 4...20 mA per modelli (DPxxx0 o 1);     |
| out H | uscita umidità 0...10 Vdc per modelli (DPxxx2 o 5);                               |

|         |  |
|---------|--|
| out NTC | uscita con sensore resistivo NTC 10K a 25 °C (standard Carel); |
| M (GO)  | riferimento sia per l'alimentazione che per le uscite;         |
| + (G)   | alimentazione (12...24 Vac o 8...32 Vdc)                       |



☛ Nota:

- con uscita configurata 0...1 Vdc o 0-10Vdc il carico deve essere >1K $\Omega$ ;
- con uscita configurata 4...20 mA il carico deve essere < 100  $\Omega$ ;
- con uscita NTC resistiva i due segnali sono isolati rispetto al riferimento M(G0).

Cablaggio del sensore allo strumento

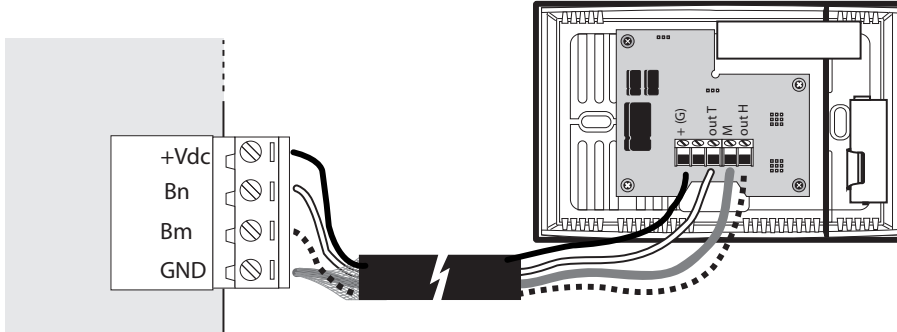


Fig. 4.e

Cablaggio del sensore allo strumento quando è richiesto un trasformatore supplementare esterno

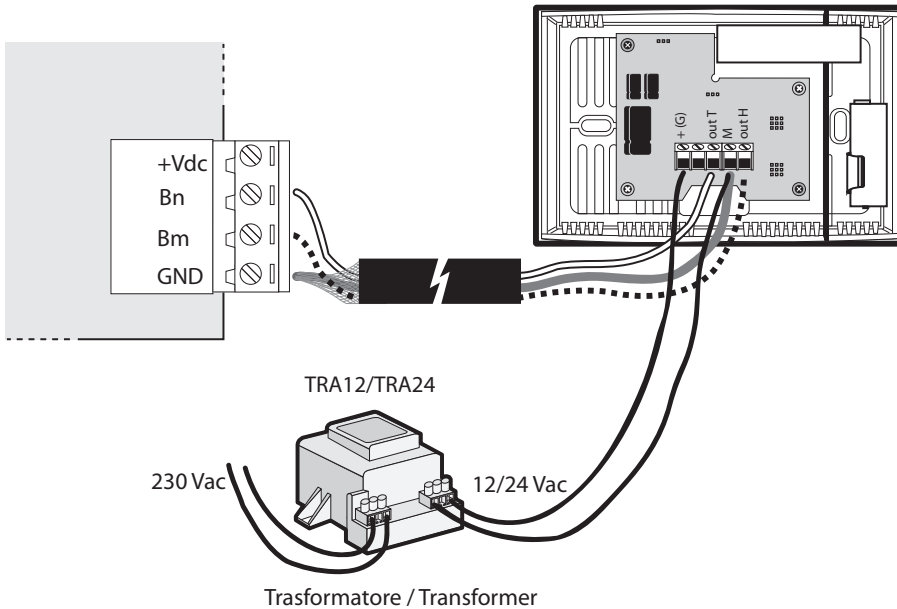


Fig. 4.f

Cablaggio del sensore con uscita in tensione o corrente

Connessione sensore con uscite in tensione o corrente e con alimentazione diretta dal controllo. Da valutare la capacità (corrente massima) di alimentazione del controllo. Per distanze >10 metri è da preferire la connessione in corrente 4...20 mA per evitare errori di misura dovuti alla caduta sul riferimento M (G0). Connessione sensore con alimentazione separata mediante trasformatore, è da utilizzare per evitare errori di misura dovuti alla corrente sulla connessione M(G0) di riferimento oppure per problemi di alimentazione su G0 con connessione a terra.

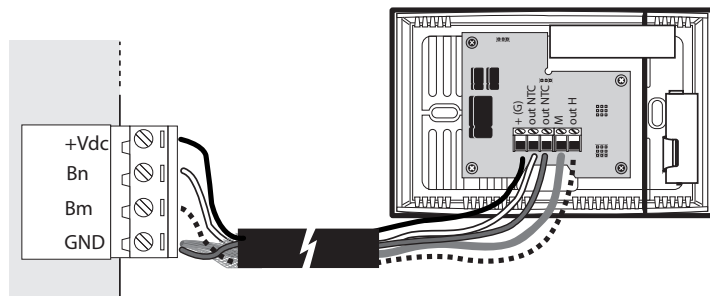


Fig. 4.g

### Cablaggio del sensore allo strumento con uscita NTC resistiva

Connessione sensore con uscita NTC resistiva: è importante che i due segnali vengano connessi direttamente ai morsetti dello strumento, NON utilizzare M(G0) come comune per la connessione del sensore NTC resistivo.

#### Schema elettrico di collegamento

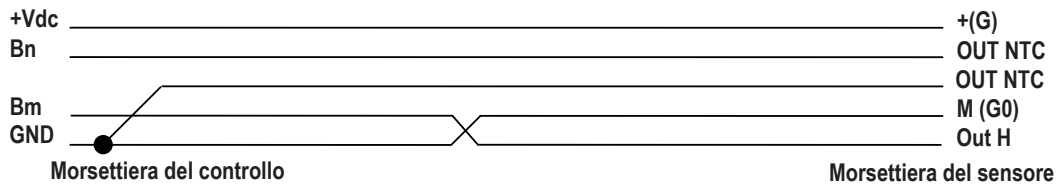


Fig. 4.h

## 4.2 Collegamenti per sensori con uscita seriale RS485

Di seguito sono riportati gli schemi delle connessioni alla morsettiera, e le impostazioni dei Dip-Switch per la configurazione della modalità di comunicazione seriale RS485 con protocollo Carel oppure Modbus.

DPW\*\*\*4\*\*\* Optoisolato  
 DPD\*\*\*4\*\*\*  
 DPP\*\*\*4\*\*\*

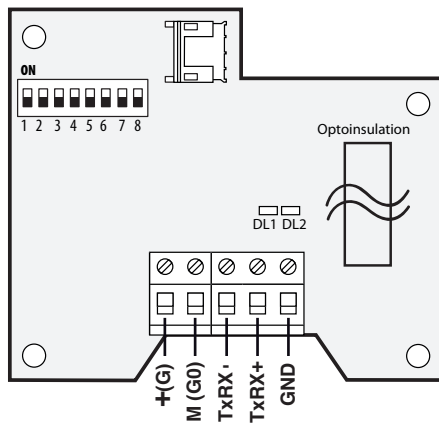


Fig. 4.a

DPW\*\*\*3\*\*\* Non Optoisolato  
 DPD\*\*\*3\*\*\*  
 DPP\*\*\*3\*\*\*

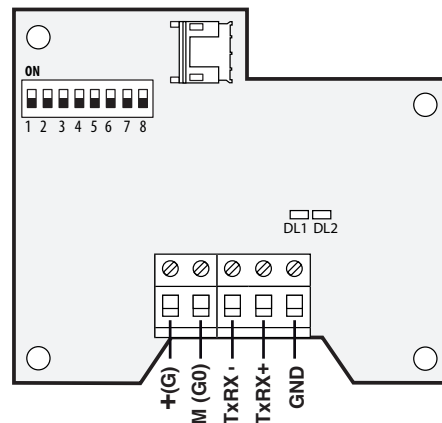


Fig. 4.b

#### Impostazioni Dip-Switch valide per tutti i modelli

| Dip-switch 1 to 5 |     | Baud rate        |
|-------------------|-----|------------------|
| 1                 | 2   | 3                |
| ON                | ON  | 9600             |
| OFF               | OFF | 19200            |
| Address 128 - 159 |     |                  |
| RS485 protocol    |     |                  |
| ON                | 6   | 7                |
| OFF               | 6   | 7                |
| ON                | ON  | CAREL supervisor |
| OFF               | OFF | ModBus®          |
| ON                | ON  | CAREL supervisor |
| OFF               | OFF | ModBus® (***)    |
| ON                | ON  | ModBus®          |
| OFF               | OFF | ModBus®          |

#### Legenda:

- TxRx+ = uscita seriale RS485 positiva
- TxRx- = uscita seriale RS485 negativa
- GND = riferimento per connessione seriale RS485
- LD1 = Led verde funzione RX
- LD2 = Led giallo funzione TX
- M(G0) = riferimento per l'alimentazione
- +(G) = alimentazione (12...24 Vac o 18...32 Vdc);

#### Nota:

- per i modelli NON isolati GND è collegato ad M(G0)
- per i modelli Optoisolati GND è isolato da M(G0)

Nella figura successiva è riportato il collegamento tra i sensori con uscita seriale e il controllo pCO1, nel quale deve essere installata l'opzione PCO100FD10.

Per la connessione con i sistemi di supervisione si possono utilizzare tutte le interfacce RS485 previste.

### 4.3 Esempio di configurazione sensore seriale RS485

La configurazione degli 8 dip-switch (DP2, 8) permette l'indirizzamento, la modalità di trasmissione seriale e la velocità.

- Selezione indirizzo (DIP 1-5). La selezione segue la regola della codifica binaria a 5 Bit.

Esempio: Off-Off-Off-Off-Off 128 / On-Off-On-Off-Off 128+5=133;

- Protocollo Supervisore CAREL / Modbus® (o Autom.);  
Velocità seriale (9600/19200 Bit/sec);

### 4.4 Esempio di collegamento alla rete RS485 Field bus

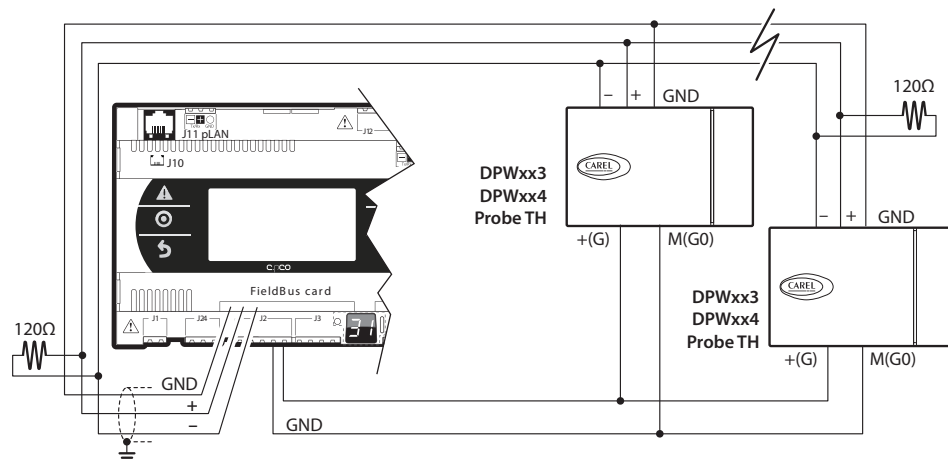


Fig. 4.c

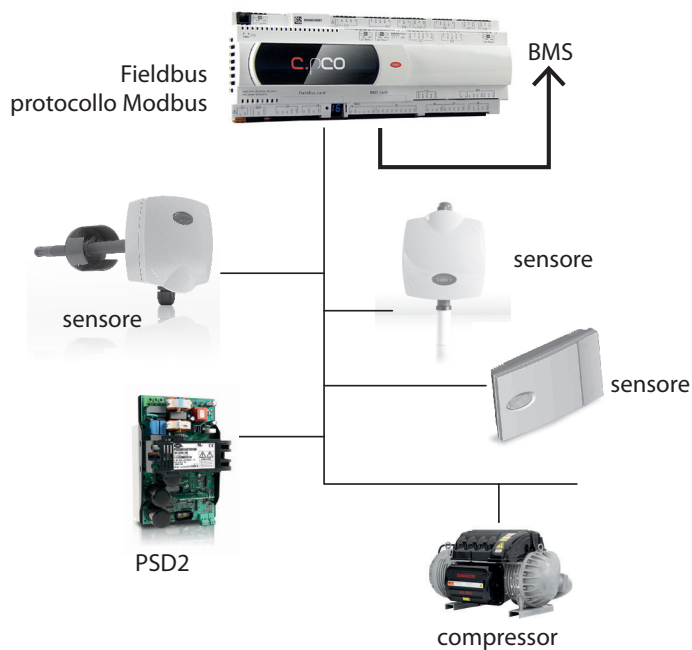


Fig. 4.d

## 4.5 Esempio di collegamento alla rete RS485 di supervisione

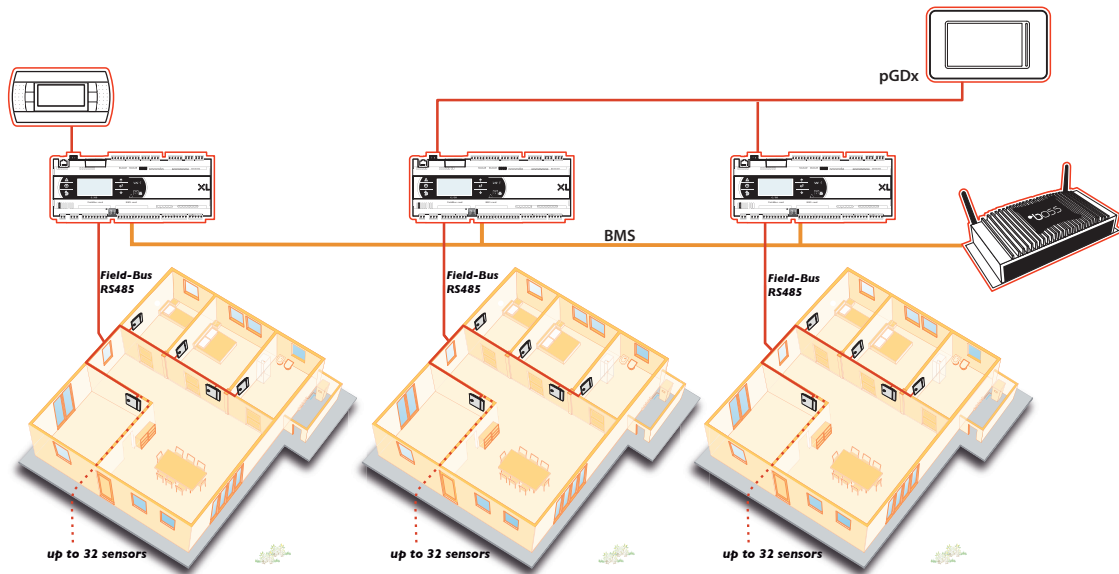


Fig. 4.e

## 4.6 Collegamento alimentazione

Per l'alimentazione in tensione alternata (12...24 Vac) si può prevedere un unico trasformatore connesso a G-G0 di tutti i sensori con G0 a terra prestando la massima attenzione nel rispettare la polarità collegando insieme i morsetti dello stesso nome, oppure prevedere un trasformatore di isolamento per ogni singola sonda.

Per i sensori seriali, il tipo di alimentazione dipende dal modello di sensore utilizzato:

- Sensori con optoisolamento: possono essere alimentati con una singola alimentazione G-G0 per tutti i sensori ed anche per il controllo. In questo caso è importante verificare che lo schermo del cavo sul lato controllo sia collegato a TERRA, direttamente o tramite la connessione G0-Terra del controllo.
- Sensori NON isolati: per brevi distanze possono essere alimentati con singola alimentazione, per distanze maggiori di 10 m può essere necessario di un trasformatore di isolamento per ogni sensore.

## 4.7 Cablaggio

Per effettuare il cablaggio, si consiglia un cavo multipolare schermato da 3 a 5 fili, in funzione dei modelli.

La sezione di cavo massima prevista dai morsetti è di 1,5 mm<sup>2</sup>. Nelle versioni DPP\*, DPD\* il diametro massimo interno del presacavo è di 8 mm.

### Versione seriale con uscita RS485

Per i sensori con connessione seriale deve essere utilizzato un cavo con le seguenti caratteristiche:

- a due fili ritorti;
- schermato, preferibilmente con filo di continuità;
- di sezione AWG20 (diam. 0,7±0,8 mm; area 0,39±0,5 mm<sup>2</sup>) o AWG22 (diam. 0,55±0,65 mm; area 0,24±0,33 mm<sup>2</sup>);
- capacità nominale tra i conduttori <100 pF/m.

### Versione analogica con uscita segnale 0...1 Vdc o -0,5...1Vdc

Con i modelli ad uscite attive (non NTC res.) configurate in tensione, si consiglia di tenere conto della caduta di tensione sui cavi: l'effetto della caduta su 1 mm<sup>2</sup> di sezione è di una variazione di 0,015 °C per metro di cavo (0,015 °C m/mm<sup>2</sup>) sulla misura di temperatura e di una variazione di 0,015% U.R. per metro di cavo (0,015% U.R. m/mm<sup>2</sup>) sulla misura di umidità.

Viene riportato di seguito un esempio per chiarire il calcolo delle variazioni che danno l'errore di temperatura e quello di umidità.

Esempio:

| Lunghezza cavo | Sezione cavo        | Errore temperatura | Errore umidità |
|----------------|---------------------|--------------------|----------------|
| 30 m           | 0,5 mm <sup>2</sup> | 0,9 °C             | 0,9% rH        |
| 30 m           | 1,5 mm <sup>2</sup> | 0,3 °C             | 0,3% rH        |

Tab. 4.a

Per evitare gli errori di misura dovuti alla corrente di alimentazione si può utilizzare un'alimentazione supplementare da un trasformatore esterno (utilizzando i codici trasformatori CAREL TRA12VDE00 o TRA2400001), da collegarsi come riportato in figura (sopra 2' con trasf.). Con tale configurazione la distanza massima è di 100m.

Il trasformatore non deve essere collegato a terra e può essere posizionato nel quadro insieme al regolatore. Il cavo di collegamento dovrà essere un multipolare da 4 o 5 fili. In tale situazione non scorre corrente di alimentazione sulla connessione M(GO). In installazioni con più sensori, utilizzare un trasformatore per ogni sensore per evitare errori di misura.

#### Versione analogica con uscita segnale 4...20 mA

Per distanze maggiori di 30 m si consiglia di selezionare, qualora il sistema lo permetta, l'uscita in corrente. La distanza massima di remotazione per l'uscita in corrente è di 200 m.

Nel caso di alimentazione in alternata è indispensabile utilizzare cavi aventi sezione di 1,5 mm<sup>2</sup> per ridurre il rumore dovuto alla corrente di alimentazione. Tale rumore può provocare, in qualche caso, instabilità di misura che può essere eliminata con alimentazione in continua o con un'alimentazione supplementare come riportato in fig. ( sopra 2' con trasf.).

## 4.8 Note funzionali sensori DP-TH (con uscita analogica)

All'accensione i sensori DP (esclusi i sensori seriali e temperatura NTC) forniscono un valore di uscita (tensione o corrente) fuori range (con valore negativo) che si stabilizza al vertice finale in 20...30 s massimo. Se i controlli prevedono segnalazioni di allarmi per fuori range si potrebbero avere delle segnalazioni che rientrano nel tempo indicato. Per la modalità di misura digitale del segnale tra scheda base e scheda sensore, si è introdotto un periodo di aggiornamento della misura di temperatura ed umidità di 15s, che può introdurre un ritardo per la misura letta. In caso di sovraccarico delle uscite (tensione e corrente), si ha un azzeramento dell'uscita per minimo ciclo di misura (15s). Anche errori di comunicazione con la scheda sensore causano un azzeramento delle uscite. La condizione con uscita 0V può essere utilizzata per gestire gli errori sonda sui controlli, ciò è possibile per le uscite 0...1V, 0...10V e 4...20mA, e non per -0,5...1V.

#### ATTENZIONE!

i sensori sono configurati di default con uscita 4...20mA. Prima di eseguire il collegamento al controllo, si consiglia di verificare la compatibilità dell'ingresso. Per eseguire una diversa configurazione del sensore modificare la sua configurazione di default.

Nei sensori con uscita temperatura e umidità, entrambi i canali sono configurati nello stesso modo, non sono possibili connessioni miste delle uscite. Per le uscite 0...1V, 0...10V e 4...20 mA i valori di inizio e fine scala sono diversi dai sensori analogici serie AS\* (vedi tabella sotto riportata).

#### Sensori con uscita normalizzata: 0...1V / 0...10V / 4...20mA

|            |            |
|------------|------------|
| -30...70°C | 0...100%rH |
| 0...1V     | 0...1V     |
| 0...10V    | 0...10V    |
| 4...20mA   | 4...20mA   |

#### Sensori con uscita: -0,5...1V

|             |            |
|-------------|------------|
| -30...70°C  | 0...100%rH |
| -0,3...0,7V | 0,0...1V   |

Tab. 4.b

Limiti da impostare nei controlli per inizio e fine range. Sono indipendenti dal range effettivo di misura.

#### Esempio. Per codice DPWC110000 (-10...60°C e 10...90% r.H.)

Per uscite 0...1V, 0...10V, 4...20mA impostare:

|          |                       |     |                         |
|----------|-----------------------|-----|-------------------------|
| 0...1V   | 0V a -30°C e 0% r.H.  | ... | 1V a 70°C e 100% r.H.   |
| 0...10V  | 0V a -30°C e 0% r.H.  | ... | 10V a 70°C e 100% r.H.  |
| 4...20mA | 4mA a -30°C e 0% r.H. | ... | 20mA a 70°C e 100% r.H. |

Tab. 4.c

Per uscita -0,5...1V (generalmente non è necessario impostare i limiti)

|               |     |                |
|---------------|-----|----------------|
| -0,3V a -30°C | ... | +0,7V a 70°C   |
| 0V a 0%r.H.   | ... | 1V a 100% r.H. |

Tab. 4.d

## 4.9 Tabella Variabili-Parametri principali per sensori seriali

I sensori seriali hanno la caratteristica di comunicare i dati via seriale RS485 (configurabili da dip-switch). È possibile accedere ai parametri via linea seriale utilizzando i protocolli Supervisore Carel o Modbus.

Il codice macchina della scheda è 59 (parametro MAC) In seguito la tabella e variabili di stato:

| Nome | Descrizione  | Read Write | Tipo A/I/D | U.M.    | #N/D   | Min  | Max  | Def | Indice SPV | Indirizzo Modbus |
|------|--|------------|------------|---------|--------|------|------|-----|------------|------------------|
| OFT  | Offset di temperatura  | R/W        | A          | °C x 10 | EEPROM | -100 | 100  | 0   | 1          | 0                |
| OFH  | Offset d'umidità   | R/W        | A          | % x 10  | EEPROM | -100 | 100  | 0   | 2          | 1                |
| DLT  | Differenziale per l'aggiornamento della temperatura                            | R/W        | A          | °C x 10 | EEPROM | 0    | 20   | 5   | 3          | 2                |
| DLH  | Differenziale per l'aggiornamento dell'umidità                                 | R/W        | A          | % x 10  | EEPROM | 0    | 20   | 5   | 4          | 3                |
| RSV  | Reserved – NON utilizzata  | R          | A          | -       | -      | 0    | 0    | -   | (5)        | 4                |
| TMP  | Valore di temperatura letto dalla sonda  | R          | A          | °C x 10 | RAM    | -500 | 1000 | -   | 6          | 5                |
| UMI  | Valore d'umidità letto dalla sonda   | R          | A          | % x 10  | RAM    | 0    | 1000 | -   | 7          | 6                |
| RUG  | Valore del punto di rugiada  | R          | A          | °C x 10 | RAM    | -500 | 2000 | -   | 8          | 7                |
| DIP  | Riporta lo stato del dipswitch   | R          | I          | -       | RAM    | 0    | 255  | -   | 6          | 133              |
| ERR  | Riporta lo stato degli errori per il sensore TH e della temperatura di rugiada | R          | I          | -       | RAM    | 0    | 4095 | -   | 7          | 134              |
| EEP  | Comando ripristino valori di default. 1 = default (torna a 0 automaticamente). | R/W        | D          | -       | RAM    | 0    | 1    | -   | 6          | 5                |
| ERT  | Errore lettura sensore Temperatura   | R          | D          | -       | RAM    | 0    | 1    | -   | 7          | 6                |
| ERH  | Errore lettura sensore Umidità   | R          | D          | -       | RAM    | 0    | 1    | -   | 8          | 7                |
| ETR  | Errore lettura calcolo Temperatura di rugiada                                  | R          | D          | -       | RAM    | 0    | 1    | -   | 9          | 8                |

Tab. 4.e

### Nota:

|   |  |
|---|--|
| A | indica variabili analogiche, il valore trasferito è in decimi (x10); |
| D | indica variabili digitali;   |
| I | indica variabili intere;   |

### Variabili di uscita

|     |   |
|-----|---|
| TMP | valore analogico della temperatura letta dal sensore;   |
| UMI | valore analogico dell'umidità relativa letta dal sensore;   |
| RUG | valore di temperatura di dew-point (@press atm std) viene calcolato in base alle due misure di temperature ed umidità. Range da -20 a +70 °C con umidità da 5 a 95%rh . |
| DIP | riporta lo stato dei dip-switch.  |

### Parametri di configurazione (memorizzati in Flash / Eeprom)

|     |  |
|-----|--|
| OFT | serve per calibrare l'HW esterno collegato al sensore e specifica il valore di offset da sommare o sottrarre al valore letto prima di essere inviato al supervisore              |
| OFH | serve per calibrare l'HW esterno collegato al sensore e specifica il valore di offset da sommare o sottrarre al valore letto prima di essere inviato al supervisore              |
| DLT | Il valore della variabile TMP non viene aggiornato se la temperatura non supererà questo differenziale   |
| DLH | Il valore della variabile UMI non viene aggiornato se l'umidità non supererà questo differenziale , serve per limitare il n. di variazioni con trasferimento di dati su seriale. |

### Errori: Variabili d'uscita

|      |  |
|------|--|
| EEP  | valore digitale per l'errore di scrittura in Flash. Può essere scritto e serve per caricare i valori di default.   |
| ERT  | indica che il dato del parametro TMP non è corretto. Questo allarme può essere generato se il sensore rileva un valore fuori range oppure se c'è un problema di comunicazione. |
| ERH  | indica che il dato del parametro UMI non è corretto. L'allarme può essere generato se il sensore rileva un valore fuori range oppure se c'è un problema di comunicazione.      |
| ETR  | indica che il dato del parametro RUG non è corretto, generato se ERT e/o ERH sono a 1.   |
| ERR  | Riporta lo stato di tutti gli allarmi come segue:  |
| Bit0 | Il sensore umidità è fuori range   |
| Bit1 | Il parametro UMI non è aggiornato per problemi di comunicazione I2C  |
| Bit4 | Il sensore temperatura è fuori range   |
| Bit5 | Il parametro TMP non è aggiornato per problemi di comunicazione I2C  |
| Bit8 | Il parametro RUG non è corretto per problemi di fuori range di UMI e TMP   |
| Bit9 | Il parametro RUG non è aggiornato per problemi di comunicazione I2C  |

## 4.10 Avvertenze generali

- Per mantenere il grado di protezione dichiarato nelle versioni con contenitore "IP55", il cablaggio deve essere realizzato con cavetti multipolari, con guaina esterna avente un diametro massimo di 8 mm.
- Si consiglia di usare cavi schermati. I cavi che portano i segnali di temperatura e umidità non devono essere alloggiati vicino ai cavi dell'alimentazione a 115...230 o 400...480 Vac, o vicino a cavi di teleruttori che portano potenza ai carichi. Si devono evitare errori di misura causati da accoppiamenti elettromagnetici.
- L'alimentazione e i segnali elettrici del sensore, sono in bassissima tensione, tuttavia per il collegamento con i controlli, tenere in considerazione che l'isolamento elettrico previsto è supplementare, escluso il cappuccio "protezione sensore". La protezione metallica dei sensori è collegata al riferimento di alimentazione dei sensori. Per conformità alle normative di sicurezza si deve prevedere un doppio isolamento per l'alimentazione del sensore e del controllo cui si collega, se la zona sensore è accessibile all'utilizzatore nell'installazione.

I sensori sono integrabili in apparecchiature di Classe I o II, con le seguenti avvertenze:

### Classe I:

- il riferimento G0 di alimentazione deve essere collegato a terra.

### Classe II:

- si deve prevedere un doppio isolamento o un isolamento rinforzato per l'alimentazione del sensore e del controllo a cui è collegato. Nel caso non sia possibile, è necessario, nell'utilizzo normale, rendere inaccessibile all'utilizzatore la zona sensori.
  - Non esporre vicino a grandi fonti di calore o a radiazioni solari dirette.

☛ **Nota:** per le connessioni delle uscite analogiche con distanze superiori a 30m l'installatore deve verificare se le opportune precauzioni e protezioni previste sono state applicate in conformità delle normative al fine di evitare guasti dovuti a Surge. In funzione dell'installazione può essere necessario il collegamento a TERRA della schermatura dei cavi di connessione segnali analogici.

## 4.11 Tabella compatibilità chimica per l'elemento sensibile

Gli elementi sensibili sono stati sottoposti a test di compatibilità chimica secondo lo standard ISO 16750-5:2003

Metodo di applicazione: spazzolamento

Tempo di riposo: 1 ora

Verifica: >24 ore dopo l'applicazione

Per ogni carico chimico sono stati testati cinque (5) campioni. Dopo l'esposizione, i campioni sono stati verificati per:

- misura dell'umidità relativa entro le specifiche;
- misura della temperatura entro le specifiche;

| Chemical Load              | %RH | T  | Chemical Load                             | %RH | T  |
|----------------------------|-----|----|---|-----|----|
| Diesel                     | OK  | OK | Refreshment containing caffeine and sugar | OK  | OK |
| Biodiesel                  | OK  | OK | Cold cleaning agent                       | OK  | OK |
| Ethanol(pure)              | OK  | OK | Spiritus                                  | OK  | OK |
| Isopropanol                | OK  | OK | Car wash cleaner                          | OK  | OK |
| Cockpit spray              | OK  | OK | Glass cleaner                             | OK  | OK |
| Protective lacquer         | OK  | OK | Interior cleaner                          | OK  | OK |
| Protective lacquer remover | OK  | OK |   |     |    |

Tab. 4.f

Inoltre, le seguenti concentrazioni di gas sono state valutate per i loro effetti sul segnale di umidità in base a test e prove sul campo.

|             | Effect in gas concentration |                                  |                                      |
|-------------|-----------------------------|----------------------------------|--------------------------------------|
|             | No effect                   | Reversible effect, offset < 5%RH | Non-reversible effect, offset > 5%RH |
| NH3 100 ppm |                             | X                                |                                      |
| CO2 5000ppm | X                           |                                  |                                      |
| NO2 3ppm    |                             | X                                |                                      |
| H2S 1ppm    | X                           |                                  |                                      |
| H2 3500 ppm | X                           |                                  |                                      |
| Cl 1ppm     |                             | X                                |                                      |

Tab. 4.g

## 4.12 Montaggio e fissaggio dello strumento

### Versione ambiente

La versione ambiente prevede il fissaggio su parete o pannello.

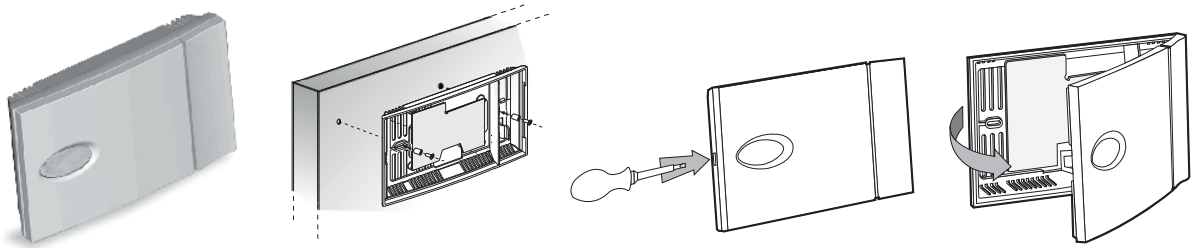


Fig. 4.f

#### ☛ Nota: di montaggio

- Aprire il contenitore con un cacciavite a taglio posizionandolo nella fessura predisposta, e prestando la massima attenzione a non danneggiare la parte elettronica;
- Fissare il retro contenitore del sensore al pannello o alla parete (per il fissaggio del contenitore, utilizzare le viti fornite insieme al kit di fissaggio, prestando la massima attenzione ad usare gli appositi distanziali, per non danneggiare l'elettronica del sensore);
- Chiudere il sensore con il coperchio superiore con una leggera pressione.

☛ Nota: prestare la massima attenzione a non togliere la scheda sensori, dall'apposito alloggiamento, evitando di sfilare il connettore che lo collega alla scheda base.

### Versione ambiente tecnico

La versione ambiente tecnico prevede il fissaggio su parete o pannello

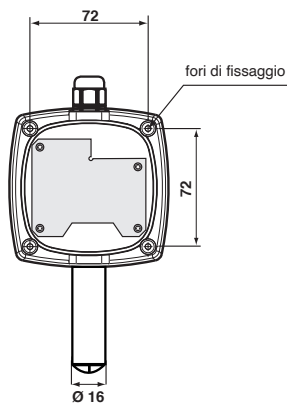


Fig. 4.g

### Note di montaggio

1. Aprire il contenitore ruotando in senso antiorario il coperchio superiore;
2. Fissare il retro contenitore del sensore al pannello o alla parete (utilizzare le viti fornite insieme al sensore) posizionando le viti nell'apposito alloggiamento.
3. Assicurarsi che le viti che bloccano la protezione della scheda, siano ben fissate.
4. Chiudere il sensore con il coperchio ruotando in senso orario il coperchio;



Fig. 4.h

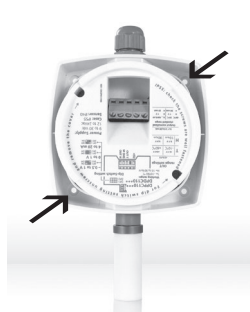


Fig. 4.i

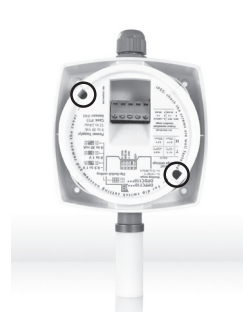


Fig. 4.j



Fig. 4.k



Per le connessioni elettriche, è necessario togliere il coperchio superiore del sensore. Per la sua configurazione vedi istruzioni in seguito riportate.

### Versione condotta

La versione per condotta è collegata alla condotta dell'aria, tramite la staffa di fissaggio predisposta.

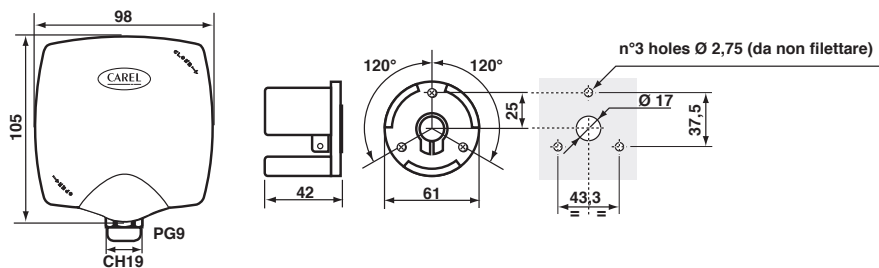


Fig. 4.l

### Note di montaggio

- Fissare la staffa alla condotta dell'aria;
- Infilare lo stelo sulla staffa alla profondità desiderata;
- Avvitare la vite presente sulla staffa per il suo fissaggio

Per le connessioni elettriche, è necessario togliere il coperchio superiore del sensore. Per la sua configurazione vedi istruzioni in seguito riportate.

## 4.13 Cambio della configurazione di default per sensore ambiente e condotta

Per cambiare la configurazione di default:

1. Rimuovere il coperchio con una rotazione in senso antiorario;
2. Rimuovere le due viti e togliere la protezione;
3. Cambiare il pin di selezione, in accordo con la configurazione desiderata;
4. Posizionare il coperchio di protezione e stringere le due viti assicurandosi che siano ben fissate;
5. Richiudere con il coperchio con una rotazione in senso orario.

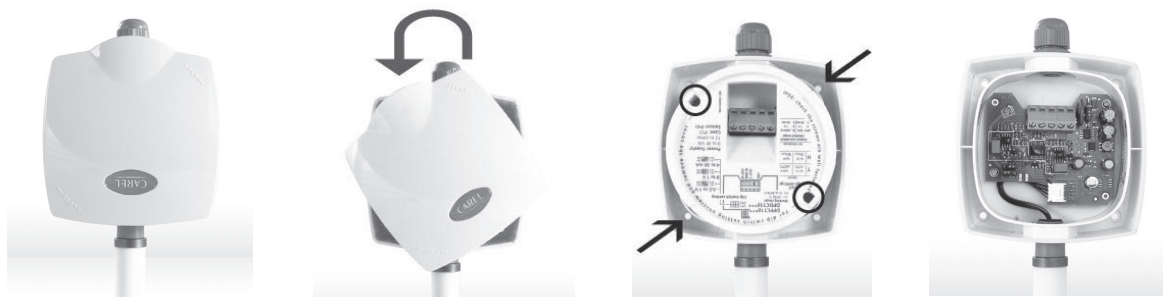


Fig. 4.m

## 4.14 Versione con sola uscita NTC

La versione solo temperatura con uscita resistiva NTC, utilizza un sensore NTC 10K@25°C (beta 3435) vedi tabella temperatura resistenza riportata in seguito, con le seguenti caratteristiche del morsetto:

|                               |                    |
|-------------------------------|--------------------|
| Sezione nominale              | 2,5mm <sup>2</sup> |
| Dimensione massima cacciavite | 2,8mm              |
| Materiale plastico morsetto   | Poliammide PA6     |
| Morsetto                      | Ottone cromato     |
| Vite del morsetto             | Acciaio cromato    |

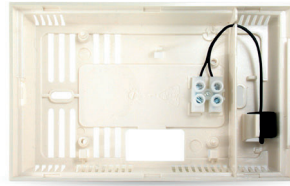
Tab. 4.h

Esempio di collegamento:  
Sensori da parete serie DPW



Fig. 4.n

## Vista interna guscio inferiore



## Vista interna guscio superiore



## Sensori per ambiente tecnico serie DPD



Fig. 4.o

## Vista sensore senza coperchio



## Vista interna



## Sensori per ambiente tecnico serie DPP



Fig. 4.p

## Vista sensore senza coperchio



## Vista interna



## 4.15 Valori di resistenza dei sensori di temperatura NTC CAREL

| Temp. | Valore di Resistenza |        |        |
|-------|----------------------|--------|--------|
|       | Max.                 | Std    | Min.   |
| °C    | KΩ                   | KΩ     | KΩ     |
| -50   | 344,40               | 329,20 | 314,70 |
| -49   | 324,70               | 310,70 | 297,20 |
| -48   | 306,40               | 293,30 | 280,70 |
| -47   | 289,20               | 277,00 | 265,30 |
| -46   | 273,20               | 261,80 | 250,60 |
| -45   | 258,10               | 247,50 | 237,20 |
| -44   | 244,00               | 234,10 | 244,60 |
| -43   | 230,80               | 221,60 | 212,70 |
| -42   | 218,50               | 209,80 | 201,50 |
| -41   | 206,80               | 198,70 | 191,00 |
| -40   | 195,90               | 188,40 | 181,10 |
| -39   | 185,40               | 178,30 | 171,59 |
| -38   | 175,50               | 168,90 | 162,00 |
| -37   | 166,20               | 160,10 | 154,10 |
| -36   | 157,50               | 151,80 | 140,20 |
| -35   | 149,30               | 144,00 | 138,80 |
| -34   | 141,60               | 136,60 | 131,80 |
| -33   | 134,40               | 129,70 | 125,20 |
| -32   | 127,60               | 123,20 | 118,90 |
| -31   | 121,20               | 117,10 | 113,10 |
| -30   | 115,10               | 111,30 | 107,50 |
| -29   | 109,30               | 105,70 | 102,20 |
| -28   | 103,80               | 100,40 | 97,16  |
| -27   | 98,63                | 95,47  | 92,41  |
| -26   | 93,75                | 90,80  | 87,93  |
| -25   | 89,15                | 86,39  | 83,70  |
| -24   | 84,82                | 82,22  | 79,71  |
| -23   | 80,72                | 78,29  | 75,93  |
| -22   | 76,85                | 74,58  | 72,36  |
| -21   | 73,20                | 71,07  | 68,99  |
| -20   | 69,74                | 67,74  | 65,80  |
| -19   | 66,42                | 64,54  | 62,72  |
| -18   | 63,27                | 61,52  | 59,81  |
| -17   | 60,30                | 58,66  | 57,05  |
| -16   | 57,49                | 55,95  | 54,44  |
| -15   | 54,83                | 53,39  | 51,97  |
| -14   | 52,31                | 50,96  | 49,83  |
| -13   | 49,93                | 48,65  | 47,12  |
| -12   | 47,67                | 46,48  | 45,31  |
| -11   | 45,53                | 44,41  | 43,32  |
| -10   | 43,50                | 42,25  | 41,43  |
| -9    | 41,54                | 40,56  | 39,59  |
| -8    | 39,68                | 38,76  | 37,85  |
| -7    | 37,91                | 37,05  | 36,20  |
| -6    | 36,24                | 35,43  | 34,02  |
| -5    | 34,65                | 33,89  | 33,14  |
| -4    | 33,14                | 32,43  | 31,73  |
| -3    | 31,71                | 31,04  | 30,39  |
| -2    | 30,35                | 29,72  | 29,11  |
| -1    | 30,00                | 28,47  | 27,89  |
| 0     | 27,83                | 27,28  | 26,74  |

| Temp. | Valore di Resistenza |       |       |
|-------|----------------------|-------|-------|
|       | Max.                 | Std   | Min.  |
| °C    | KΩ                   | KΩ    | KΩ    |
| 1     | 26,64                | 26,13 | 25,52 |
| 2     | 25,51                | 25,03 | 24,55 |
| 3     | 24,24                | 23,99 | 23,54 |
| 4     | 23,42                | 22,99 | 22,57 |
| 5     | 22,45                | 22,05 | 21,66 |
| 6     | 21,52                | 21,15 | 20,78 |
| 7     | 20,64                | 20,29 | 19,95 |
| 8     | 19,80                | 19,40 | 19,15 |
| 9     | 19,00                | 18,70 | 18,40 |
| 10    | 18,24                | 17,96 | 17,67 |
| 11    | 17,51                | 17,24 | 16,97 |
| 12    | 16,80                | 16,55 | 16,31 |
| 13    | 16,13                | 15,90 | 15,87 |
| 14    | 15,50                | 15,28 | 15,06 |
| 15    | 14,89                | 14,68 | 14,48 |
| 16    | 14,31                | 14,12 | 13,93 |
| 17    | 13,75                | 13,57 | 13,40 |
| 18    | 13,22                | 13,06 | 12,89 |
| 19    | 12,72                | 12,56 | 12,41 |
| 20    | 12,23                | 12,09 | 11,95 |
| 21    | 11,77                | 11,63 | 11,57 |
| 22    | 11,32                | 11,20 | 11,07 |
| 23    | 10,90                | 10,78 | 10,60 |
| 24    | 10,49                | 10,38 | 10,27 |
| 25    | 10,10                | 10,00 | 9,90  |
| 26    | 9,73                 | 9,63  | 9,52  |
| 27    | 9,38                 | 9,28  | 9,18  |
| 28    | 9,04                 | 8,94  | 8,84  |
| 29    | 8,72                 | 8,62  | 8,52  |
| 30    | 8,41                 | 8,31  | 8,21  |
| 31    | 8,11                 | 8,01  | 7,91  |
| 32    | 7,82                 | 7,72  | 7,62  |
| 33    | 7,55                 | 7,45  | 7,35  |
| 34    | 7,28                 | 7,19  | 7,09  |
| 35    | 7,03                 | 6,94  | 6,84  |
| 36    | 6,79                 | 6,69  | 6,60  |
| 37    | 6,56                 | 6,46  | 6,37  |
| 38    | 6,33                 | 6,24  | 6,15  |
| 39    | 6,12                 | 6,03  | 5,94  |
| 40    | 5,92                 | 5,82  | 5,73  |
| 41    | 5,72                 | 5,63  | 5,54  |
| 42    | 5,53                 | 5,43  | 5,35  |
| 43    | 5,34                 | 5,25  | 5,17  |
| 44    | 5,16                 | 5,08  | 4,99  |
| 45    | 4,99                 | 4,91  | 4,82  |
| 46    | 4,83                 | 4,74  | 4,66  |
| 47    | 4,67                 | 4,59  | 4,51  |
| 48    | 4,52                 | 4,44  | 4,36  |
| 49    | 4,38                 | 4,30  | 4,22  |
| 50    | 4,24                 | 4,16  | 4,08  |
| 51    | 4,10                 | 4,02  | 3,95  |
| 52    | 3,97                 | 3,90  | 3,82  |
| 53    | 3,84                 | 3,77  | 3,69  |
| 54    | 3,72                 | 3,65  | 3,57  |
| 55    | 3,61                 | 3,53  | 3,46  |

| Temp. | Valore di Resistenza |      |      |
|-------|----------------------|------|------|
|       | Max.                 | Std  | Min. |
| °C    | KΩ                   | KΩ   | KΩ   |
| 56    | 3,49                 | 3,42 | 3,35 |
| 57    | 3,39                 | 3,31 | 3,24 |
| 58    | 3,28                 | 3,21 | 3,14 |
| 59    | 3,18                 | 3,11 | 3,04 |
| 60    | 3,09                 | 3,02 | 2,95 |
| 61    | 2,99                 | 2,92 | 2,86 |
| 62    | 2,90                 | 2,83 | 2,77 |
| 63    | 2,81                 | 2,75 | 2,69 |
| 64    | 2,73                 | 2,66 | 2,60 |
| 65    | 2,65                 | 2,58 | 2,52 |
| 66    | 2,57                 | 2,51 | 2,45 |
| 67    | 2,49                 | 2,43 | 2,37 |
| 68    | 2,42                 | 2,36 | 2,30 |
| 69    | 2,35                 | 2,29 | 2,24 |
| 70    | 2,28                 | 2,22 | 2,17 |
| 71    | 2,21                 | 2,16 | 2,10 |
| 72    | 2,15                 | 2,10 | 2,04 |
| 73    | 2,09                 | 2,04 | 1,98 |
| 74    | 2,03                 | 1,98 | 1,93 |
| 75    | 1,97                 | 1,92 | 1,87 |
| 76    | 1,92                 | 1,87 | 1,82 |
| 77    | 1,86                 | 1,81 | 1,78 |
| 78    | 1,81                 | 1,76 | 1,71 |
| 79    | 1,76                 | 1,71 | 1,68 |
| 80    | 1,71                 | 1,66 | 1,62 |
| 81    | 1,66                 | 1,62 | 1,57 |
| 82    | 1,62                 | 1,57 | 1,53 |
| 83    | 1,57                 | 1,53 | 1,49 |
| 84    | 1,53                 | 1,49 | 1,44 |
| 85    | 1,49                 | 1,45 | 1,40 |
| 86    | 1,45                 | 1,41 | 1,37 |
| 87    | 1,41                 | 1,37 | 1,33 |
| 88    | 1,37                 | 1,33 | 1,29 |
| 89    | 1,34                 | 1,30 | 1,26 |
| 90    | 1,30                 | 1,26 | 1,22 |
| 91    | 1,27                 | 1,23 | 1,19 |
| 92    | 1,23                 | 1,20 | 1,16 |
| 93    | 1,20                 | 1,16 | 1,13 |
| 94    | 1,17                 | 1,13 | 1,10 |
| 95    | 1,14                 | 1,10 | 1,07 |
| 96    | 1,11                 | 1,08 | 1,04 |
| 97    | 1,08                 | 1,05 | 1,01 |
| 98    | 1,05                 | 1,02 | 0,99 |
| 99    | 1,03                 | 0,99 | 0,96 |
| 100   | 1,00                 | 0,97 | 0,94 |
| 101   | 0,98                 | 0,94 | 0,91 |
| 102   | 0,95                 | 0,92 | 0,89 |
| 103   | 0,93                 | 0,90 | 0,87 |
| 104   | 0,91                 | 0,87 | 0,84 |
| 105   | 0,88                 | 0,85 | 0,82 |
| 106   | 0,86                 | 0,83 | 0,80 |
| 107   | 0,84                 | 0,81 | 0,78 |
| 108   | 0,82                 | 0,79 | 0,76 |
| 109   | 0,80                 | 0,77 | 0,74 |
| 110   | 0,78                 | 0,75 | 0,73 |

Tab. 4.i

## 4.16 Caratteristiche tecniche

| Alimentazione  | da 8 a 32 Vdc<br>da 18 a 32 Vdc per versioni con uscita 0...10V<br>12...24 Vac tolleranza -10%, +15%   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
|--|--|-----|-----|-----|-----|-----|-----|-----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|---|--|--|--|--|--|--|--|--|--|-----|---|----|----|----|----|----|----|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|----|-----|-----|-----|-----|-----|-----|-----|-----|--|---|-----|-----|-----|-----|-----|-----|-----|-----|--|
| Assorbimento (uscite attive 0...1V 4-20mA e 0...10V)         | - uscita in tensione carico 10kΩ, 2 uscite Vout max<br>10 mA @ 12 Vdc alimentazione<br>35 mA, picco @ 24 Vdc alimentazione<br>- uscita in corrente, 2 uscite a 20 mA<br>35mA @ 12 Vdc alimentazione<br>24mA @ 24 Vdc alimentazione   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Assorbimento in AC (VA)                                      | 50mA @ 12 Vac alimentazione<br>24mA @ 24 Vac alimentazione<br>0,6 VA max consumo / sensore   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Assorbimento (Uscita Seriale RS485) In DC (mA)               | - versione Seriale diretta<br>typ. 5 – max 12 mA @ 12 Vdc alimentazione<br>typ.4 - max 8 mA @ 24 Vdc alimentazione<br>- versione Seriale Optoisolata typ - max<br>typ.14 - max 20mA @ 12 Vdc alimentazione<br>typ.9 – max 13 mA @ 24 Vdc alimentazione   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Assorbimento In AC (VA)                                      | 35 – 49mA rms @ 12 Vac<br>25 – 33mA rms @ 24 Vac<br>0,8 VA max consumo / sensore   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Campo di lavoro  | <b>sensori DPW</b><br>Temperatura: da -10 °C a +60 °C<br>Umidità: da 10 a 90 %U.R.<br><b>sensori DPD e DPP</b><br>Temperatura: da -20 °C a +70 °C<br>Umidità: da 10 a 90 %U.R. e da 0 a 100 %U.R. a seconda del modello  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Precisione   | NTC resistivo: ±0,3 °C a 25 °C, ±0,5 °C da 0 °C a 50 °C, ±0,7 °C -20T70 °C   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
|  | <table border="1"> <thead> <tr> <th>%rH</th> <th>0</th> <th>10</th> <th>20</th> <th>30</th> <th>40</th> <th>50</th> <th>60</th> <th>70</th> <th>°C</th> </tr> </thead> <tbody> <tr><td>100</td><td>3,7</td><td>3,2</td><td>2,7</td><td>2,7</td><td>2,7</td><td>2,7</td><td>3,2</td><td>3,7</td><td></td></tr> <tr><td>90</td><td>3,2</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,7</td><td>2,7</td><td>3,2</td><td></td></tr> <tr><td>80</td><td>3,2</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,7</td><td>2,7</td><td></td></tr> <tr><td>70</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,7</td><td></td></tr> <tr><td>60</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,7</td><td></td></tr> <tr><td>50</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td></td></tr> <tr><td>40</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td></td></tr> <tr><td>30</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td></td></tr> <tr><td>20</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td></td></tr> <tr><td>10</td><td>3,2</td><td>3,2</td><td>2,7</td><td>2,7</td><td>2,7</td><td>2,7</td><td>2,7</td><td>2,7</td><td></td></tr> <tr><td>0</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr> </tbody> </table><br><table border="1"> <thead> <tr> <th>%rH</th> <th>0</th> <th>10</th> <th>20</th> <th>30</th> <th>40</th> <th>50</th> <th>60</th> <th>70</th> <th>°C</th> </tr> </thead> <tbody> <tr><td>100</td><td>3,7</td><td>3,2</td><td>2,7</td><td>2,7</td><td>2,7</td><td>2,7</td><td>3,2</td><td>3,7</td><td></td></tr> <tr><td>90</td><td>3,2</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,7</td><td>3,2</td><td></td></tr> <tr><td>80</td><td>2,7</td><td>2,2</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,2</td><td>2,2</td><td>2,7</td><td></td></tr> <tr><td>70</td><td>2,2</td><td>2,2</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,2</td><td>2,2</td><td></td></tr> <tr><td>60</td><td>2,2</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,2</td><td></td></tr> <tr><td>50</td><td>2,2</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td></td></tr> <tr><td>40</td><td>2,2</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td></td></tr> <tr><td>30</td><td>2,2</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td></td></tr> <tr><td>20</td><td>2,2</td><td>2,2</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td>2,0</td><td></td></tr> <tr><td>10</td><td>2,7</td><td>2,7</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td>2,2</td><td></td></tr> <tr><td>0</td><td>3,2</td><td>3,2</td><td>2,7</td><td>2,7</td><td>2,7</td><td>2,7</td><td>2,7</td><td>2,7</td><td></td></tr> </tbody> </table> | %rH | 0   | 10  | 20  | 30  | 40  | 50  | 60 | 70 | °C | 100 | 3,7 | 3,2 | 2,7 | 2,7 | 2,7 | 2,7 | 3,2 | 3,7 |  | 90 | 3,2 | 2,7 | 2,2 | 2,2 | 2,2 | 2,7 | 2,7 | 3,2 |  | 80 | 3,2 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,7 | 2,7 |  | 70 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,7 |  | 60 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,7 |  | 50 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |  | 40 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |  | 30 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |  | 20 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |  | 10 | 3,2 | 3,2 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 |  | 0 |  |  |  |  |  |  |  |  |  | %rH | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | °C | 100 | 3,7 | 3,2 | 2,7 | 2,7 | 2,7 | 2,7 | 3,2 | 3,7 |  | 90 | 3,2 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,7 | 3,2 |  | 80 | 2,7 | 2,2 | 2,0 | 2,0 | 2,0 | 2,2 | 2,2 | 2,7 |  | 70 | 2,2 | 2,2 | 2,0 | 2,0 | 2,0 | 2,0 | 2,2 | 2,2 |  | 60 | 2,2 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,2 |  | 50 | 2,2 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |  | 40 | 2,2 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |  | 30 | 2,2 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |  | 20 | 2,2 | 2,2 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |  | 10 | 2,7 | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |  | 0 | 3,2 | 3,2 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 |  |
| %rH  | 0  | 10  | 20  | 30  | 40  | 50  | 60  | 70  | °C |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 100  | 3,7  | 3,2 | 2,7 | 2,7 | 2,7 | 2,7 | 3,2 | 3,7 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 90   | 3,2  | 2,7 | 2,2 | 2,2 | 2,2 | 2,7 | 2,7 | 3,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 80   | 3,2  | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,7 | 2,7 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 70   | 2,7  | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,7 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 60   | 2,7  | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,7 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 50   | 2,7  | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 40   | 2,7  | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 30   | 2,7  | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 20   | 2,7  | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 10   | 3,2  | 3,2 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 0  |  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| %rH  | 0  | 10  | 20  | 30  | 40  | 50  | 60  | 70  | °C |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 100  | 3,7  | 3,2 | 2,7 | 2,7 | 2,7 | 2,7 | 3,2 | 3,7 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 90   | 3,2  | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,7 | 3,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 80   | 2,7  | 2,2 | 2,0 | 2,0 | 2,0 | 2,2 | 2,2 | 2,7 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 70   | 2,2  | 2,2 | 2,0 | 2,0 | 2,0 | 2,0 | 2,2 | 2,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 60   | 2,2  | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 50   | 2,2  | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 40   | 2,2  | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 30   | 2,2  | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 20   | 2,2  | 2,2 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 | 2,0 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 10   | 2,7  | 2,7 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 | 2,2 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| 0  | 3,2  | 3,2 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 | 2,7 |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
|  | <p>Sensore 10-90%rH (codici DP**1*****)<br/>HUM: ±2.2% min, vedi tabella<br/>TEMP: ±0.6°C @ 25°C; ±0.9°C @ -10T60°C</p> <p>Sensore 0-100%rH (codici DP**2*****)<br/>HUM: ±2% min, vedi tabella<br/>TEMP: ±0.5°C @ 25°C; ±0.9°C @ -20T70°C</p> <p><b>ATTENZIONE:</b> possibili variazioni entro ±2°C e ±5%rH in presenza di forti campi elettromagnetici (10V/m)</p>  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Immagazzinamento   | -20T70 °C ; 10-90%rh non condensante   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Funzionamento limiti   | -10T60 °C ; 10-90%rh non condensante per versioni DPW<br>-20T70 °C ; 0-100%rh non condensante per versioni DPD DPP   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Sensore Temperatura  | NTC 10KΩ a 25 °C 1%  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Sensore Umidità  | Sensore Capacitivo   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Segnali d'uscita di umidità                                  | Range 0...100% rh<br>Tensione 10 mV/%rh per 0..1V (carico Rmin = 1 kΩ)<br>Tensione 100 mV/%rh per 0..10V (carico Rmin = 1 kΩ)<br>Corrente 4...20mA 4mA=0%rh; 20mA=100%rh (carico Rmax= 100 Ω)  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Segnali d'uscita di temperatura                              | Range -30T70°C<br>Tensione 10 mV/%rh per -0,5..1V (carico Rmin = 1 kΩ)<br>Tensione per 0..1V 0V = -30°C ; 1V = +70°C (carico Rmin = 1 kΩ)<br>Tensione per 0..10V 0V = -30°C ; 10V = +70°C (carico Rmin = 1 kΩ)<br>Corrente 4...20 mA 4 mA=-30°C ; 20 mA=+70°C (carico Rmax= 100Ω)  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Morsettiera  | Morsetti a vite per cavi di sezione max. 1,5 – min. 0,5 mm2  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Grado di protezione contenitore                              | IP55 per DPD, DPP (per condotta e amb. Tecnico)<br>IP30 per DPW (da parete)  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Grado di protezione elemento sensibile                       | IP54 per DPP<br>IP40 per DPD<br>IP30 per DPW   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Costante di tempo Temperatura                                | in aria ferma 300 s<br>in aria ventilata (3 m/s) 60 s  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Costante di tempo Umidità                                    | in aria ferma 60 s<br>in aria ventilata (3 m/s) 20 s   |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Classific. secondo la protezione contro le scosse elettriche | Integrabili in apparecchiature di Classe I e II  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| PTI dei materiali per isolamento                             | 250 V  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Periodo delle sollecitazioni elettriche delle parti isolanti | Lungo  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Grado di inquinamento ambientale                             | Normale  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Categoria di resistenza al calore e al fuoco                 | Categoria D (per scatola e coperchio)  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |
| Categoria (immunità contro le sovratensioni)                 | Categoria 2  |     |     |     |     |     |     |     |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |  |  |  |  |  |  |  |  |  |     |   |    |    |    |    |    |    |    |    |     |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |    |     |     |     |     |     |     |     |     |  |   |     |     |     |     |     |     |     |     |  |

Tab. 4.j

### 4.16.1 Pulizia e manutenzione

Per la pulizia dello strumento non utilizzare alcool etilico, idrocarburi (benzina), ammoniaca e derivati. È consigliabile usare detergenti neutri ed acqua. Controllare periodicamente le fessure predisposte di aerazione del sensore per verificare che l'aria possa circolare liberamente attraverso le fessure, senza ostruzioni dovute ad impurità o polveri presenti nel sito di installazione.

## 4.17 Dimensioni meccaniche

### 4.17.1 Modello DPW

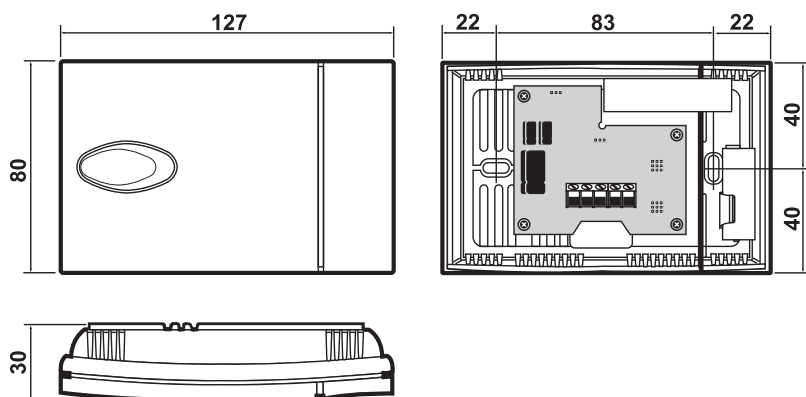


Fig. 4.a

### 4.17.2 Modello DPD

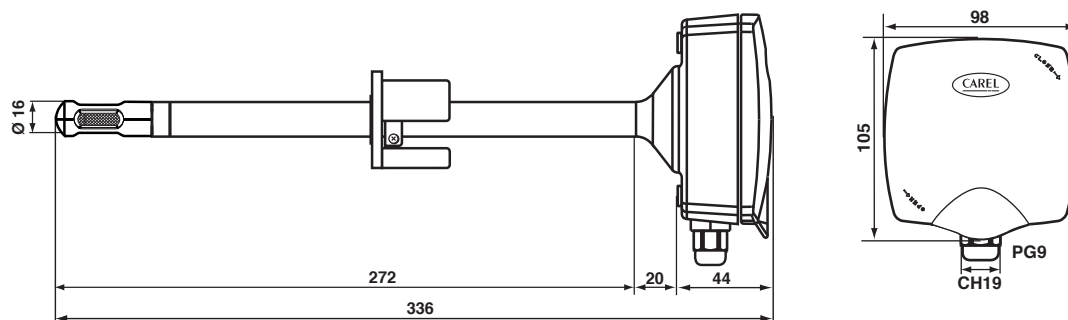


Fig. 4.b

### 4.17.3 Modello DPP

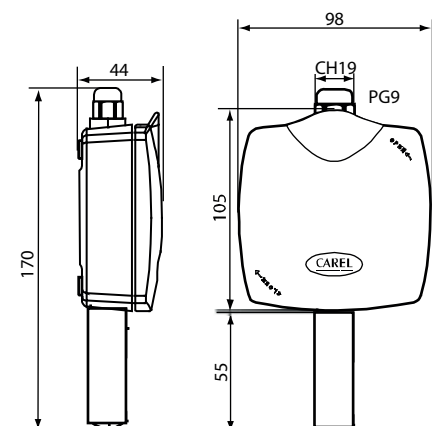


Fig. 4.c



## GENERAL WARNINGS



CAREL bases the development of its products on decades of experience in HVAC/R, on continuous investments in technological innovations to products, procedures and strict quality processes with in-circuit and functional testing on 100% of its products, and on the most innovative production technology available on the market. CAREL and its subsidiaries/affiliates nonetheless cannot guarantee that all the aspects of the product and the software included with the product respond to the requirements of the final application, despite the product being developed according to start-of-the-art techniques. The customer (manufacturer, developer or installer of the final equipment) accepts all liability and risk relating to the configuration of the product in order to reach the expected results in relation to the specific final installation and/or equipment. CAREL may, based on specific agreements, act as a consultant for the successful commissioning of the final unit/application, however in no case does it accept liability for the correct operation of the final equipment/system. The CAREL product is a state-of-the-art product, whose operation is specified in the technical documentation supplied with the product or can be downloaded, even prior to purchase, from the website [www.carel.com](http://www.carel.com). Each CAREL product, in relation to its advanced level of technology, requires setup/configuration/programming/commissioning to be able to operate in the best possible way for the specific application. Failure to complete such operations, which are required/indicated in the user manual, may cause the final product to malfunction; CAREL accepts no liability in such cases. Only qualified personnel may install or carry out technical service on the product.

The customer must only use the product in the manner described in the documentation relating to the product. In addition to observing any further warnings described in this manual, the following warnings must be heeded for all CAREL products:

- prevent the electronic circuits from getting wet. Rain, humidity and all types of liquids or condensate contain corrosive minerals that may damage the electronic circuits. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual;
- do not install the device in particularly hot environments. Too high temperatures may reduce the life of electronic devices, damage them and deform or melt the plastic parts. In any case, the product should be used or stored in environments that comply with the temperature and humidity limits specified in the manual;
- do not attempt to open the device in any way other than described in the manual.
- do not drop, hit or shake the device, as the internal circuits and mechanisms may be irreparably damaged.
- do not use corrosive chemicals, solvents or aggressive detergents to clean the device.
- do not use the product for applications other than those specified in the technical manual.

All of the above suggestions likewise apply to the controllers, serial cards, programming keys or any other accessory in the CAREL product portfolio. CAREL adopts a policy of continual development. Consequently, CAREL reserves the right to make changes and improvements to any product described in this document without prior warning. The technical specifications shown in the manual may be changed without prior warning. The liability of CAREL in relation to its products is specified in the CAREL general contract conditions, available on the website [www.carel.com](http://www.carel.com) and/or by specific agreements with customers; specifically, to the extent where allowed by applicable legislation, in no case will CAREL, its employees or subsidiaries/affiliates be liable for any lost earnings or sales, losses of data and information, costs of replacement goods or services, damage to things or people, downtime or any direct, indirect, incidental, actual, punitive, exemplary, special or consequential damage of any kind whatsoever, whether contractual, extra-contractual or due to negligence, or any other liabilities deriving from the installation, use or impossibility to use the product, even if CAREL or its subsidiaries/affiliates are warned of the possibility of such damage.

## DISPOSAL



Fig. 1



Fig. 2

### INFORMATION FOR USERS ON THE CORRECT HANDLING OF WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE)

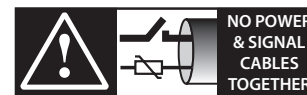
The product is made up of metal parts and plastic parts. In reference to European Union directive 2002/96/EC issued on 27 January 2003 and related national legislation, please note that:

- WEEE cannot be disposed of as municipal waste and such waste must be collected and disposed of separately;
- the public or private waste collection systems defined by local legislation must be used. In addition, the equipment can be returned to the distributor at the end of its working life when buying new equipment;
- the equipment may contain hazardous substances: the improper use or incorrect disposal of such may have negative effects on human health and on the environment;
- the symbol (crossed-out wheeled bin) shown on the product or on the packaging and on the instruction sheet indicates that the equipment has been introduced onto the market after 13 August 2005 and that it must be disposed of separately;
- in the event of illegal disposal of electrical and electronic waste, the penalties are specified by local waste disposal legislation.

**Warranty on materials:** 2 years (from production date, excluding consumables).

**Approval:** the quality and safety of CAREL S.p.A. products are guaranteed by the ISO 9001 certified design and production system.

## IMPORTANT



**READ CAREFULLY IN THE TEXT!**

Separate as much as possible the probe and digital input cables from cables to inductive loads and power cables, so as to avoid possible electromagnetic disturbance. Never run power cables (including the electrical panel cables) and signal cables in the same conduits.

### Key to the symbols:



**Important:** to bring critical issues to the attention of those using the product.



**Note:** to focus attention on important topics; in particular the practical application of the various product functions.



**Important:** This product is to be integrated and/or incorporated into the final apparatus or equipment. Verification of conformity to the laws and technical standards in force in the country where the final apparatus or equipment will be operated is the manufacturer's responsibility. Before delivering the product, Carel has already completed the checks and tests required by the relevant European directives and harmonised standards, using a typical test setup, which however cannot be considered as representing all possible conditions of the final installation.





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# 1. INTRODUCTION

For ever greater device integration, Carel supplies complete and advanced solutions capable of responding to most of the applications required by the market.

Carel offers control and humidification systems for the HVAC/R market including controllers, humidifiers, recovery units, supervision instruments and a wide range of accessories, such as sensors for measuring environmental parameters. This is why Carel offers a whole range of sensors that meet the needs of HVAC/R installers and manufacturers implementing innovative technological solutions that fully comply with the most important standards.

The range features sensors for different uses designed to be installed on the wall of the monitored environment, in ducts and in industrial environments and air quality sensors all of which guarantee the specifications, compatibility with controllers and the trademark quality that distinguish Carel products.

The range includes the DP-TH series (temperature and humidity versions) with 4 ...20mA, 0...10V analogue output and RS485 serial outputs (Carel or Modbus) and the DP-IAQ (Indoor Air Quality) series, for temperature, humidity CO<sub>2</sub>, VOC (Volatile Organic Compounds) PM<sub>2.5</sub> and PM<sub>10</sub> with RS485 (Modbus) serial outputs. The DP\* series sensors use digital output sensors for good accuracy at an excellent price/quality ratio. These sensors are typically used together with the Carel controllers but they can also be used with third-party devices because they have standard outputs making them easy to connect and integrate.

## 1.1 General features

Carel has designed a whole range of sensors that meet market requirements for controlling HVAC/R units. In addition to their recognised performance, Carel sensors are very versatile and suited for the most diverse requirements. The range includes the DP-TH series of temperature and humidity sensors and the DP-IAQ series of sensors for detecting parameters such as: Temperature, Humidity, CO<sub>2</sub>, VOC (Volatile Organic Compounds), PM<sub>2.5</sub> and PM<sub>10</sub>. All the sensors are designed to be compatible with all Carel controllers and also with the standards most commonly used in the industry. The following models are available: a) wall, b) industrial environment, c) duct for residential or industrial installations.

### 1.1.1 DP-IAQ Sensors

By measuring temperature, humidity, CO<sub>2</sub> (carbon dioxide), VOC (Volatile Organic Compounds), PM<sub>2.5</sub> and PM<sub>10</sub>, the Carel air quality sensors analyse the main parameters that indicate the pollution level in the environment, providing everything the HVAC/R market needs with a single sensor.

Available in various combinations with wall and duct installation versions, they have an RS485 Modbus serial communication output for connection and integration to the Carel system.

With display



Without display



#### Wall sensors (DPWQ\*)

They are used in rooms, in ventilation and air conditioning systems and wherever the air quality must be monitored. They are ready for wall-mounting. Available in versions with and without display.

Fig. 1.a



#### Duct sensors (DPDQ\*)

These are used in ducted heating and air-conditioning systems. They are supplied together with a fastening bracket. A version without a display is available.

Fig. 1.b

### 1.1.2 DP-TH Sensors

The Carel DP-TH sensors measure temperature and humidity for HVAC/R units. Available temperature only or temperature and humidity in combinations; wall and duct versions. Available temperature only or temperature and humidity in combinations; wall and duct versions.



#### Wall sensors (DPW\*)

These are used in heating and air-conditioning systems. Their design makes them suitable for use in the home. Ready for wall-mounting.

Fig. 1.c



#### Sensors for industrial environments (DPP\*)

These are used in industrial environments (cold rooms, pools etc.) where a high index of protection is required, both for the case (IP55) and the sensors (IP54). Ready for wall-mounting.

Fig. 1.d

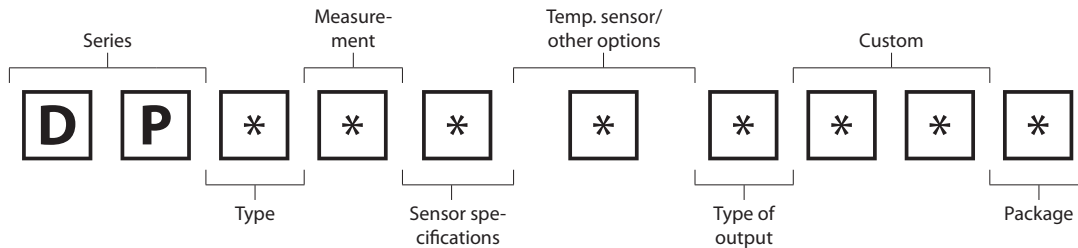


#### Duct sensors (DPD\*)

These are used in ducted heating and air-conditioning systems. Supplied together with a fastening bracket.

Fig. 1.e

# 2. CODES AND COMPATIBILITY



|                             |   |                                    |  |
|-----------------------------|---|------------------------------------|--|
| <b>Series</b>               | DP (Digital sensor)   | <b>Temp. sensor/ other options</b> | 0 = Not present;<br>1 = NTC.   |
| <b>Type</b>                 | W = Ambient<br>P = Industrial environment<br>D = Duct   |                                    | If digit 4 is Q → 0= Version without display<br>→ 1 = Version with display   |
| <b>Measurement</b>          | T = Temperature<br>H = Humidity<br>C = Temperature and Humidity<br>Q = Indoor air quality   | <b>Type of output</b>              | 0 = Output 0...1Vdc o 4...20mA;<br>1 = Output 0...1V o 4...20mA and NTC resistive;<br>2 = Output 0...10Vdc;<br>4 = RS485 Modbus/Carel serial output optically-isolated<br>5 = Output 0...10V ed NTC resistive<br>B = RS485 Modbus serial output optically-isolated |
| <b>Sensor specification</b> | 0 = Not present;<br>1 = 10...90%rh;<br>2 = 0...100%rh.<br>6 = T H (range 0...50°C)<br>7 = T H (range 0...50°C), CO2 (5000ppm)<br>8 = T H (range 0...50°C), CO2 (5000ppm), VOC<br>9 = T H (range 0...50°C), CO2 (5000ppm), VOC, PM2.5 - PM10 | <b>Custom</b>                      | 01= Colour RAL9010 with Carel logo   |
|                             |   | <b>Packaging</b>                   | 0 = Single;<br>1 = Multiple;<br>N = Neutral;<br>* = Custom   |

Tab. 2.a

The following table shows the available codes.

| P/N        | Description  | new | Power supply | Type of installation |                 |            | Display   |        | Detect. parameters |       |     |     | Output signals |        |          |           |
|------------|--|-----|--------------|----------------------|-----------------|------------|-----------|--------|--------------------|-------|-----|-----|----------------|--------|----------|-----------|
|            |  |     |              | Duct                 | Panel ind. env. | Panel env. | No displ. | Displ. | Temp.              | %R.H. | CO2 | VOC | PM 2.5/10      | RS 485 | 0...10 V | 4...20 mA |
| DPWT010000 | Wall version, output 0...1 V/-0.5...1 Vdc/4...20 mA  |     | 12-24 Vac/dc |                      |                 | •          | •         | •      |                    |       |     |     |                |        | •        |           |
| DPWT011000 | Wall version, output 0...1 V/-0.5...1 Vdc/4...20 mA  |     | 12-24 Vac/dc |                      |                 | •          | •         | •      |                    |       |     |     |                |        |          | •         |
| DPWC111000 | Wall version, output 0...1 V/-0.5...1 Vdc/4...20 mA  |     | 12-24 Vac/dc |                      |                 | •          | •         | •      | •                  |       |     |     |                |        | •        | •         |
| DPWC110000 | Wall version, output 0...1 V/-0.5...1 Vdc/4...20 mA  |     | 12-24 Vac/dc |                      |                 | •          | •         | •      | •                  |       |     |     |                |        | •        |           |
| DPWC115000 | Wall version, 0...10 Vdc output                      |     | 12-24 Vac/dc |                      |                 | •          | •         | •      | •                  |       |     |     |                | •      |          | •         |
| DPWC112000 | Wall version, 0...10 Vdc output                      |     | 12-24 Vac/dc |                      |                 | •          | •         | •      | •                  |       |     |     |                | •      |          |           |
| DPWC114000 | Wall version, output opto-isolated RS485 serial      |     | 12-24 Vac/dc |                      |                 | •          | •         | •      | •                  |       |     | •   |                |        |          |           |
| DPWT014000 | Wall version, output opto-isolated RS485 serial      |     | 12-24 Vac/dc |                      |                 | •          | •         | •      |                    |       |     | •   |                |        |          |           |
| DPPT010000 | Wall version, output 0...1 V/-0.5...1 Vdc/4...20 mA  |     | 12-24 Vac/dc |                      | •               |            | •         | •      |                    |       |     |     |                |        | •        |           |
| DPPT011000 | Wall version, output 0...1 V/-0.5...1 Vdc/4...20 mA  |     | 12-24 Vac/dc |                      | •               |            | •         | •      |                    |       |     |     |                |        |          | •         |
| DPPC111000 | Wall version, 0...1 V/-0.5...1 Vdc/4...20 mA output  |     | 12-24 Vac/dc |                      | •               |            | •         | •      | •                  |       |     |     |                |        | •        | •         |
| DPPC110000 | Wall version, output 0...1 V/-0.5...1 Vdc/4...20 mA  |     | 12-24 Vac/dc |                      | •               |            | •         | •      | •                  |       |     |     |                |        | •        |           |
| DPPC210000 | Wall version, output 0...1 V/-0.5...1 Vdc/4...20 mA  |     | 12-24 Vac/dc |                      | •               |            | •         | •      | •                  |       |     |     |                |        | •        |           |
| DPPC112000 | Wall version, 0...10 Vdc output                      |     | 12-24 Vac/dc |                      | •               |            | •         | •      | •                  |       |     |     |                | •      |          |           |
| DPPC212000 | Wall version, 0...10 Vdc output                      |     | 12-24 Vac/dc |                      | •               |            | •         | •      | •                  |       |     |     |                | •      |          |           |
| DPPT014000 | Wall version, output opto-isolated RS485 serial      |     | 12-24 Vac/dc |                      | •               |            | •         | •      |                    |       |     | •   |                |        |          |           |
| DPPC114000 | Wall version, output opto-isolated RS485 serial      |     | 12-24 Vac/dc |                      | •               |            | •         | •      | •                  |       |     | •   |                |        |          |           |
| DPPC214000 | Wall version, optically isolated RS485 serial output |     | 12-24 Vac/dc |                      | •               |            | •         | •      | •                  |       |     | •   |                |        |          |           |
| DPDT010000 | Duct version output 0...1 V/-0.5...1 Vdc/4...20 mA)  |     | 12-24 Vac/dc | •                    |                 |            | •         | •      |                    |       |     |     |                |        | •        |           |
| DPDT011000 | Duct version output 0...1 V/-0.5...1 Vdc/4...20 mA)  |     | 12-24 Vac/dc | •                    |                 |            | •         | •      |                    |       |     |     |                |        |          | •         |
| DPDC111000 | Duct version output 0...1 V/-0.5...1 Vdc/4...20 mA)  |     | 12-24 Vac/dc | •                    |                 |            | •         | •      | •                  |       |     |     |                |        | •        | •         |
| DPDC110000 | Duct version output 0...1 V/-0.5...1 Vdc/4...20 mA)  |     | 12-24 Vac/dc | •                    |                 |            | •         | •      | •                  |       |     |     |                |        | •        |           |

| P/N        | Description  | new | Power supply | Type of installation |                 |            | Display   |        | Detect. parameters |       |     |     |           | Output signals |          |           |         |   |
|------------|--|-----|--------------|----------------------|-----------------|------------|-----------|--------|--------------------|-------|-----|-----|-----------|----------------|----------|-----------|---------|---|
|            |  |     |              | Duct                 | Panel ind. env. | Panel env. | No displ. | Displ. | Temp.              | %R.H. | CO2 | VOC | PM 2.5/10 | RS 485         | 0...10 V | 4...20 mA | NTC 10K |   |
| DPDC210000 | Duct version output (0...1 V/-0.5...1 Vdc/4...20 mA)   |     | 12-24 Vac/dc | ●                    |                 |            | ●         |        | ●                  | ●     |     |     |           |                |          |           | ●       |   |
| DPDC112000 | Duct version 0...10 Vdc output                         |     | 12-24 Vac/dc | ●                    |                 |            | ●         |        | ●                  | ●     |     |     |           |                |          |           | ●       |   |
| DPDC212000 | Duct version 0...10 Vdc output                         |     | 12-24 Vac/dc | ●                    |                 |            | ●         |        | ●                  | ●     |     |     |           |                |          |           | ●       |   |
| DPDT014000 | Duct version output opto-isolated RS485 serial         |     | 12-24 Vac/dc | ●                    |                 |            | ●         |        | ●                  |       |     |     |           | ●              |          |           |         |   |
| DPDC114000 | Duct version output opto-isolated RS485 serial         |     | 12-24 Vac/dc | ●                    |                 |            | ●         |        | ●                  | ●     |     |     |           | ●              |          |           |         |   |
| DPDC214000 | Duct version output opto-isolated RS485 serial         |     | 12-24 Vac/dc | ●                    |                 |            | ●         |        | ●                  | ●     |     |     |           | ●              |          |           |         |   |
| DPWQ306000 | Wall air quality sensor VOC (0-10Vdc or 4-20mA output) |     | 24 Vac/Vdc   |                      |                 | ●          | ●         |        |                    |       |     | ●   |           |                |          |           | ●       | ● |
| DPWQ402000 | Wall air quality sensor CO2 (0-10Vdc output)           |     | 24 Vac/Vdc   |                      |                 | ●          | ●         |        |                    |       |     | ●   |           |                |          |           | ●       | ● |
| DPWQ502000 | Wall air quality sensor VOC and CO2 (0-10Vdc output)   |     | 24 Vac/Vdc   |                      |                 | ●          | ●         |        |                    |       |     | ●   | ●         |                |          |           | ●       | ● |
| DPDQ306000 | Duct air quality sensor VOC (0-10Vdc or 4-20mA output) |     | 24 Vac/Vdc   | ●                    |                 |            | ●         |        |                    |       |     | ●   |           |                |          |           | ●       | ● |
| DPDQ402000 | Duct air quality sensor CO2 (0-10Vdc output)           |     | 24 Vac/Vdc   | ●                    |                 |            | ●         |        |                    |       |     | ●   |           |                |          |           | ●       | ● |
| DPDQ502000 | Duct air quality sensor VOC and CO2 (0-10Vdc output)   |     | 24 Vac/Vdc   | ●                    |                 |            | ●         |        |                    |       |     | ●   | ●         |                |          |           | ●       | ● |
| DPWQ60B010 | Temperature, Humidity                                  | ●   | 24 Vac/Vdc   |                      |                 | ●          | ●         |        | ●                  | ●     |     |     |           | ●              |          |           |         |   |
| DPWQ70B010 | Temperature, Humidity, CO2                             | ●   | 24 Vac/Vdc   |                      |                 | ●          | ●         |        | ●                  | ●     | ●   |     |           | ●              |          |           |         |   |
| DPWQ80B010 | Temperature, Humidity, CO2 VOC                         | ●   | 24 Vac/Vdc   |                      |                 | ●          | ●         |        | ●                  | ●     | ●   | ●   |           | ●              |          |           |         |   |
| DPWQ90B010 | Temperature, Humidity, CO2 VOC PM2,5 PM10              | ●   | 24 Vac/Vdc   |                      |                 | ●          | ●         |        | ●                  | ●     | ●   | ●   | ●         | ●              | ●        |           |         |   |
| DPWQ61B010 | Temperature, Humidity                                  | ●   | 24 Vac/dc    |                      |                 | ●          |           | ●      | ●                  | ●     |     |     |           | ●              |          |           |         |   |
| DPWQ71B010 | Temperature, Humidity, CO2                             | ●   | 24 Vac/dc    |                      |                 | ●          |           | ●      | ●                  | ●     | ●   |     |           | ●              |          |           |         |   |
| DPWQ81B010 | Temperature, Humidity, CO2 VOC                         | ●   | 24 Vac/dc    |                      |                 | ●          |           | ●      | ●                  | ●     | ●   | ●   |           | ●              |          |           |         |   |
| DPWQ91B010 | Temperature, Humidity, CO2 VOC PM2,5 PM10              | ●   | 24 Vac/dc    |                      |                 | ●          |           | ●      | ●                  | ●     | ●   | ●   | ●         | ●              | ●        |           |         |   |
| DPDQ60B010 | Temperature, Humidity                                  | ●   | 24 Vac/dc    | ●                    |                 |            | ●         |        | ●                  | ●     |     |     |           | ●              |          |           |         |   |
| DPDQ70B010 | Temperature, Humidity, CO2                             | ●   | 24 Vac/dc    | ●                    |                 |            | ●         |        | ●                  | ●     | ●   |     |           | ●              |          |           |         |   |

Tab. 2.b

# 3. INSTALLATION DP-IAQ SENSORS

## 3.1 Assembly and fastening the instrument

The installation of the instrument depends on the purchased product version.

### Wall version

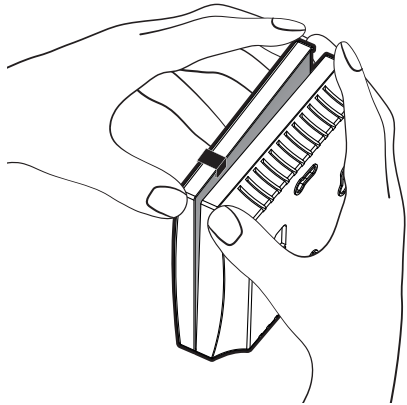


Fig. 3.a

New products have a separator placed on the product to divide the lower shell from the upper shell to make it easier to open the instrument.

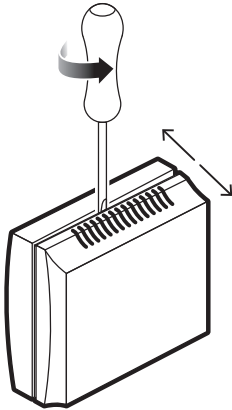


Fig. 3.b

If the separator has already been removed, the product can still be opened using a screwdriver as follows

Insert a screwdriver in the middle of the slot, press down and lift the bottom frame slightly. Pull the cover forward and hold.

After separating the 2 parts of the product, proceed with the installation using the screws purchased separately. We recommend the use of screws with a maximum diameter of 3mm for the wall-mounted version of the product. We recommend the use of screws with a maximum diameter of 5mm for the duct version. If you purchase the version with a PM2.5/PM10 sensor, be careful not to damage the connection wires between the upper and lower parts.

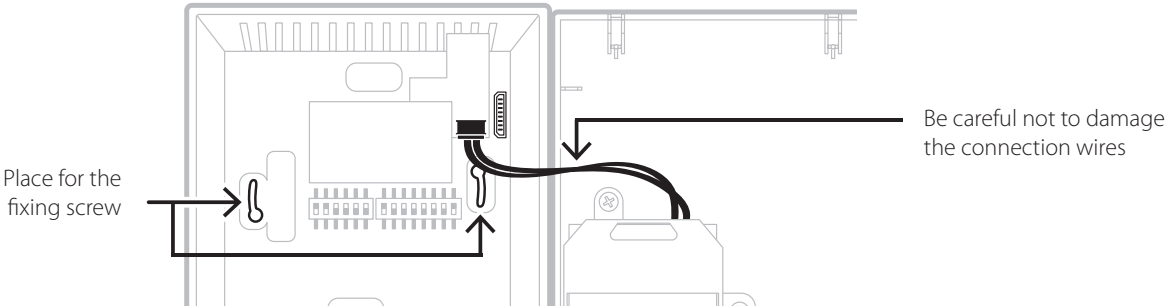


Fig. 3.c

Place for the fixing screw

Be careful not to damage the connection wires

Duct version

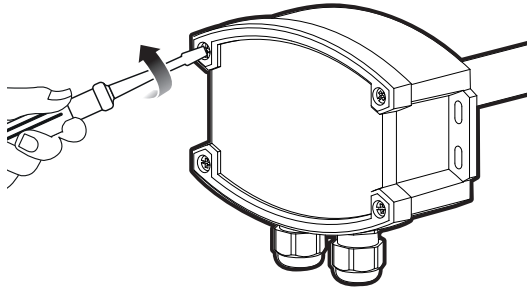


Fig. 3.d  
Unscrew the 4 quick-release screws

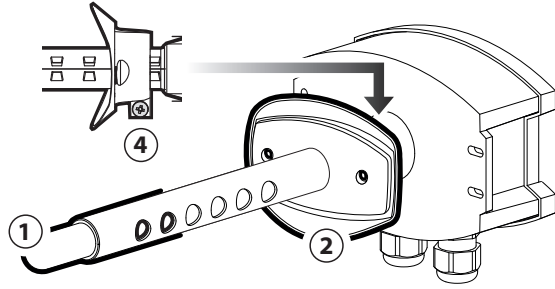


Fig. 3.e

1. It is advisable to choose the duct section appropriately. The tip of the sensor must be positioned in a well-ventilated area.
2. Install the insulation support to the duct by fixing it with 2 screws to the appropriate slots.
3. Slide the sensor stem into the insulation bracket.
4. Tighten the bracket fixing screw to secure the sensor on the duct.

Mounting diagram

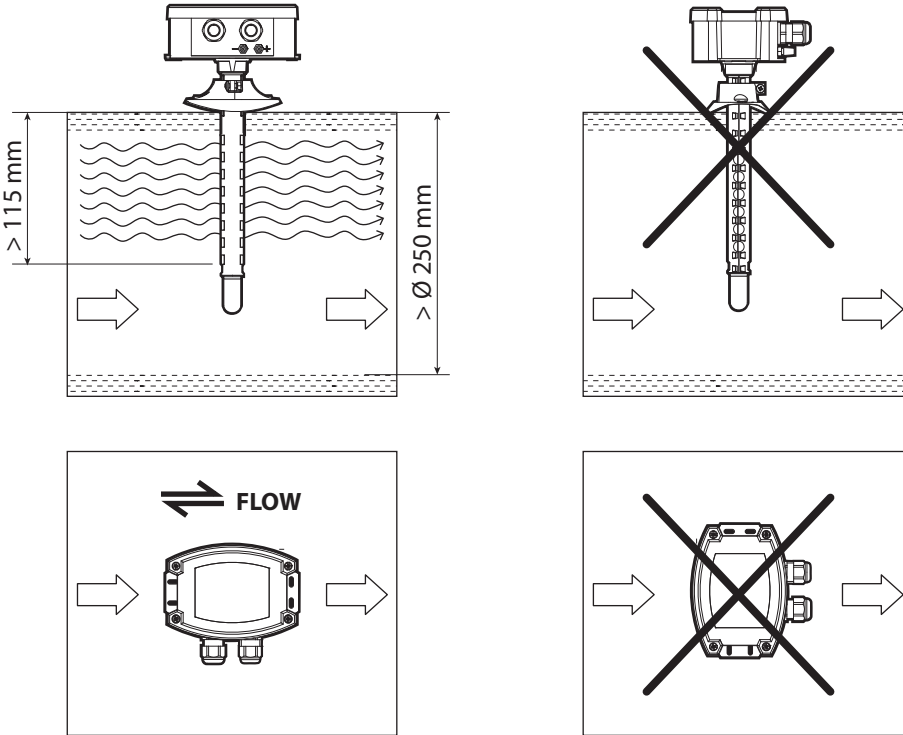


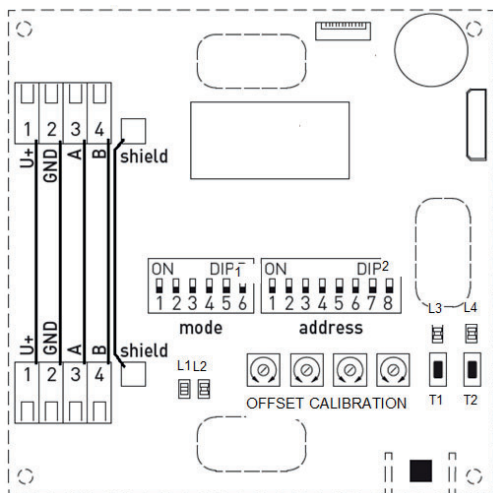
Fig. 3.f



## 3.2 Electrical connections and DP-IAQ sensor wiring

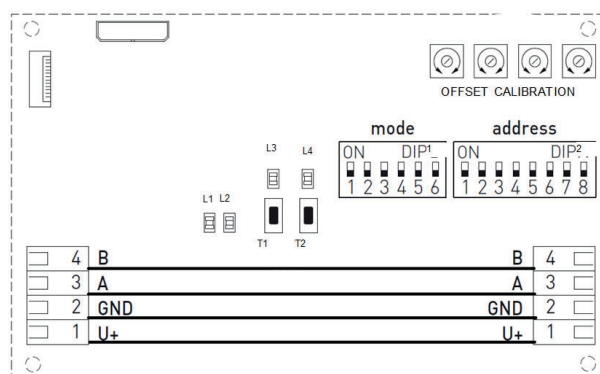
Make the electrical connections as shown below, taking care to follow the polarities indicated

### Wall version



Inside the product, there is a double terminal block to simplify connection in the case of several devices. The power supply and the serial connection can be connected on a single terminal if it is not necessary to use the double terminal block. Alternatively, the power supply can be connected on one terminal and the serial connection on the other, always respecting the instructions on the product

### Duct version



#### Key:

|                     |  |
|---------------------|--|
| A:                  | TxRx+ RS485 positive serial output   |
| B:                  | TxRx- RS485 negative serial output   |
| GND                 | reference for power supply.<br>In the case of Vac power supply, connect one of the 2 transformer wires.                            |
| U+:                 | +24Vdc. In the case of Vac power supply, connect the second transformer wire.  |
| DIP1, DIP 2:        | DIP switch for setting the serial line   |
| L1...L4:            | LED status   |
| OFFSET CALIBRATION: | These trimmers are used to calibrate the sensors. Do not use during normal product operation. Return the product if tampered with. |
| T1:                 | key used for calibration manual CO2  |
| T2:                 | key used for calibration manual VOC  |

Tab. 3.c

A 2-wire shielded multi-core cable with the following characteristics must be used for the serial connection:

- two-twisted wires;
- shielded, preferably with earth wire;
- section AWG20 (diam. 0.7-0.8 mm; area 0.39-0.5 mm<sup>2</sup>) or AWG22 (diam. 0.55-0.65 mm; area 0.24-0.33 mm<sup>2</sup>);
- rated capacitance between the wires <100 pF/m.

A 2-core cable with 2 wires and a maximum cross-section of 1.5 mm<sup>2</sup> is recommended for the power supply

### 3.3 DP-IAQ sensor configuration

The 2 DIP switches (DIP1, DIP2) can be configured to set the address, the serial transmission mode and speed. DIP 1 can be used to set the operating mode of the serial line, select the transmission speed and all the parameters required for the correct operation of the instrument.

#### Dip1 Modbus mode setting



| Baud rate (selectable) | SW1 | SW2 | Parity (selectable) | SW3 | Parity check (on/off)               | SW4 | 8N1-MODBUS (on/off) | SW5 | Bus termination (on/off) | SW6 |
|------------------------|-----|-----|---------------------|-----|-------------------------------------|-----|---------------------|-----|--------------------------|-----|
| 9600 baud              | ON  | OFF | EVEN (numbered)     | ON  | Active (1 stop bit)                 | ON  | Active              | ON  | Active                   | ON  |
| 19200 baud             | ON  | ON  | ODD (numbered)      | OFF | Inactive (no parity) (12 stop bits) | OFF | Inactive (default)  | OFF | Inactive                 | OFF |
| 38400 baud             | OFF | ON  |                     |     |                                     |     |                     |     |                          |     |
| Reserved               | OFF | OFF |                     |     |                                     |     |                     |     |                          |     |

Tab. 3.d

The Parity function (DIP1 SW3) and the Parity check function (DIP1 SW4) are automatically disabled if function 8N1 (DIP1 SW5) is activated,

The 120ohm line termination resistor can be activated or not using bit 6 of DIP 1.

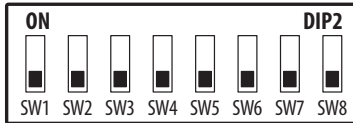
Take care to activate this resistor only on the last instrument in the line and not on the intermediate ones to ensure the correct operation of the system. The end-of-line resistor is active when Active is selected.

The following are the most common settings for best operation with Carel systems:

**SW1 ON, SW2 ON, SW3 --, SW4 OFF, SW5 OFF, SW6 OFF.**

DIP 2 can be used to set the serial address of the instrument, selecting between 1 and 247

#### Dip2 Address setting



The rule for setting the address follows the binary coding rule, see the table below for an easy and safe selection of the address you want to give the instrument.

#### Serial address

|    | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |    | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1  | OFF | OFF | OFF | OFF | OFF | OFF | OFF | ON  | 31 | OFF | OFF | OFF | ON  | ON  | ON  | ON  | ON  |
| 2  | OFF | OFF | OFF | OFF | OFF | OFF | ON  | OFF | 32 | OFF | OFF | ON  | OFF | OFF | OFF | OFF | OFF |
| 3  | OFF | OFF | OFF | OFF | OFF | OFF | ON  | ON  | 33 | OFF | OFF | ON  | OFF | OFF | OFF | OFF | ON  |
| 4  | OFF | OFF | OFF | OFF | OFF | ON  | OFF | OFF | 34 | OFF | OFF | ON  | ON  | OFF | OFF | ON  | OFF |
| 5  | OFF | OFF | OFF | OFF | OFF | ON  | ON  | ON  | 35 | OFF | OFF | ON  | OFF | OFF | OFF | ON  | ON  |
| 6  | OFF | OFF | OFF | OFF | OFF | ON  | ON  | OFF | 36 | OFF | OFF | ON  | OFF | OFF | ON  | OFF | OFF |
| 7  | OFF | OFF | OFF | OFF | OFF | ON  | ON  | ON  | 37 | OFF | OFF | ON  | OFF | OFF | ON  | OFF | ON  |
| 8  | OFF | OFF | OFF | OFF | ON  | OFF | OFF | OFF | 38 | OFF | OFF | ON  | OFF | OFF | ON  | ON  | OFF |
| 9  | OFF | OFF | OFF | OFF | ON  | OFF | OFF | ON  | 39 | OFF | OFF | ON  | ON  | OFF | ON  | ON  | ON  |
| 10 | OFF | OFF | OFF | OFF | ON  | OFF | ON  | OFF | 40 | OFF | OFF | ON  | OFF | ON  | OFF | OFF | OFF |
| 11 | OFF | OFF | OFF | OFF | ON  | OFF | ON  | ON  | 41 | OFF | OFF | ON  | OFF | ON  | OFF | OFF | ON  |
| 12 | OFF | OFF | OFF | OFF | ON  | ON  | OFF | OFF | 42 | OFF | OFF | ON  | OFF | ON  | OFF | ON  | OFF |
| 13 | OFF | OFF | OFF | OFF | ON  | ON  | ON  | ON  | 43 | OFF | OFF | ON  | OFF | ON  | OFF | ON  | ON  |
| 14 | OFF | OFF | OFF | OFF | ON  | ON  | ON  | OFF | 44 | OFF | OFF | ON  | ON  | ON  | ON  | OFF | OFF |
| 15 | OFF | OFF | OFF | OFF | ON  | ON  | ON  | ON  | 45 | OFF | OFF | ON  | OFF | ON  | ON  | OFF | ON  |
| 16 | OFF | OFF | OFF | ON  | OFF | OFF | OFF | OFF | 46 | OFF | OFF | ON  | OFF | ON  | ON  | ON  | OFF |
| 17 | OFF | OFF | OFF | ON  | OFF | OFF | OFF | ON  | 47 | OFF | OFF | ON  | OFF | ON  | ON  | ON  | ON  |
| 18 | OFF | OFF | OFF | ON  | OFF | OFF | ON  | OFF | 48 | OFF | OFF | ON  | ON  | OFF | OFF | OFF | OFF |
| 19 | OFF | OFF | OFF | ON  | OFF | OFF | ON  | ON  | 49 | OFF | OFF | ON  | ON  | OFF | OFF | OFF | ON  |
| 20 | OFF | OFF | OFF | ON  | OFF | ON  | OFF | OFF | 50 | OFF | OFF | ON  | ON  | OFF | OFF | ON  | OFF |
| 21 | OFF | OFF | OFF | ON  | OFF | ON  | OFF | ON  | 51 | OFF | OFF | ON  | ON  | OFF | OFF | ON  | ON  |
| 22 | OFF | OFF | OFF | ON  | OFF | ON  | ON  | OFF | 52 | OFF | OFF | ON  | ON  | OFF | ON  | OFF | OFF |
| 23 | OFF | OFF | OFF | ON  | OFF | ON  | ON  | ON  | 53 | OFF | OFF | ON  | ON  | OFF | ON  | OFF | ON  |
| 24 | OFF | OFF | OFF | ON  | ON  | OFF | OFF | OFF | 54 | OFF | OFF | ON  | ON  | OFF | ON  | ON  | OFF |
| 25 | OFF | OFF | OFF | ON  | ON  | OFF | OFF | ON  | 55 | OFF | OFF | ON  | ON  | OFF | ON  | ON  | ON  |
| 26 | OFF | OFF | OFF | ON  | ON  | OFF | ON  | OFF | 56 | OFF | OFF | ON  | ON  | ON  | OFF | OFF | OFF |
| 27 | OFF | OFF | OFF | ON  | ON  | OFF | ON  | ON  | 57 | OFF | OFF | ON  | ON  | ON  | OFF | OFF | ON  |
| 28 | OFF | OFF | OFF | ON  | ON  | ON  | ON  | OFF | 58 | OFF | OFF | ON  | ON  | ON  | OFF | ON  | OFF |
| 29 | OFF | OFF | OFF | ON  | ON  | ON  | OFF | ON  | 59 | OFF | OFF | ON  | ON  | ON  | OFF | ON  | ON  |
| 30 | OFF | OFF | OFF | ON  | ON  | ON  | ON  | OFF | 60 | OFF | OFF | ON  | ON  | ON  | ON  | OFF | OFF |

|     | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 61  | OFF | OFF | ON  | ON  | ON  | ON  | OFF | ON  |
| 62  | OFF | OFF | ON  | ON  | ON  | ON  | ON  | OFF |
| 63  | OFF | OFF | ON  | ON  | ON  | ON  | ON  | ON  |
| 64  | OFF | ON  | OFF | OFF | OFF | OFF | OFF | OFF |
| 65  | OFF | ON  | OFF | OFF | OFF | OFF | OFF | ON  |
| 66  | OFF | ON  | OFF | OFF | OFF | OFF | ON  | OFF |
| 67  | OFF | ON  | OFF | OFF | OFF | OFF | ON  | ON  |
| 68  | OFF | ON  | OFF | OFF | OFF | ON  | OFF | OFF |
| 69  | OFF | ON  | OFF | OFF | OFF | ON  | OFF | ON  |
| 70  | OFF | ON  | OFF | OFF | OFF | ON  | ON  | OFF |
| 71  | OFF | ON  | OFF | OFF | OFF | ON  | ON  | ON  |
| 72  | OFF | ON  | OFF | OFF | ON  | OFF | OFF | OFF |
| 73  | OFF | ON  | OFF | OFF | ON  | OFF | OFF | ON  |
| 74  | OFF | ON  | OFF | OFF | ON  | OFF | ON  | OFF |
| 75  | OFF | ON  | OFF | OFF | ON  | OFF | ON  | ON  |
| 76  | OFF | ON  | OFF | OFF | ON  | ON  | OFF | OFF |
| 77  | OFF | ON  | OFF | OFF | ON  | ON  | OFF | ON  |
| 78  | OFF | ON  | OFF | OFF | ON  | ON  | ON  | OFF |
| 79  | OFF | ON  | OFF | OFF | ON  | ON  | ON  | ON  |
| 80  | OFF | ON  | OFF | ON  | OFF | OFF | OFF | OFF |
| 81  | OFF | ON  | OFF | ON  | OFF | OFF | OFF | ON  |
| 82  | OFF | ON  | OFF | ON  | OFF | OFF | ON  | OFF |
| 83  | OFF | ON  | OFF | ON  | OFF | OFF | ON  | ON  |
| 84  | OFF | ON  | OFF | ON  | OFF | ON  | OFF | OFF |
| 85  | OFF | ON  | OFF | ON  | OFF | ON  | OFF | ON  |
| 86  | OFF | ON  | OFF | ON  | OFF | ON  | ON  | OFF |
| 87  | OFF | ON  | OFF | ON  | OFF | ON  | ON  | ON  |
| 88  | OFF | ON  | OFF | ON  | ON  | OFF | OFF | OFF |
| 89  | OFF | ON  | OFF | ON  | ON  | OFF | OFF | ON  |
| 90  | OFF | ON  | OFF | ON  | ON  | OFF | ON  | OFF |
| 91  | OFF | ON  | OFF | ON  | ON  | OFF | ON  | ON  |
| 92  | OFF | ON  | OFF | ON  | ON  | ON  | OFF | OFF |
| 93  | OFF | ON  | OFF | ON  | ON  | ON  | OFF | ON  |
| 94  | OFF | ON  | OFF | ON  | ON  | ON  | ON  | OFF |
| 95  | OFF | ON  | OFF | ON  | ON  | ON  | ON  | ON  |
| 96  | OFF | ON  | ON  | OFF | OFF | OFF | OFF | OFF |
| 97  | OFF | ON  | ON  | OFF | OFF | OFF | OFF | ON  |
| 98  | OFF | ON  | ON  | OFF | OFF | OFF | ON  | OFF |
| 99  | OFF | ON  | ON  | OFF | OFF | OFF | ON  | ON  |
| 100 | OFF | ON  | ON  | OFF | OFF | ON  | OFF | OFF |
| 101 | OFF | ON  | ON  | OFF | OFF | ON  | OFF | ON  |
| 102 | OFF | ON  | ON  | OFF | OFF | ON  | ON  | OFF |
| 103 | OFF | ON  | ON  | OFF | OFF | ON  | ON  | ON  |
| 104 | OFF | ON  | ON  | OFF | ON  | OFF | OFF | OFF |
| 105 | OFF | ON  | ON  | OFF | ON  | OFF | OFF | ON  |
| 106 | OFF | ON  | ON  | OFF | ON  | OFF | ON  | OFF |
| 107 | OFF | ON  | ON  | OFF | ON  | OFF | ON  | ON  |
| 108 | OFF | ON  | ON  | OFF | ON  | ON  | OFF | OFF |
| 109 | OFF | ON  | ON  | OFF | ON  | ON  | OFF | ON  |
| 110 | OFF | ON  | ON  | OFF | ON  | ON  | ON  | OFF |
| 111 | OFF | ON  | ON  | OFF | ON  | ON  | ON  | ON  |
| 112 | OFF | ON  | ON  | ON  | OFF | OFF | OFF | OFF |
| 113 | OFF | ON  | ON  | ON  | OFF | OFF | OFF | ON  |
| 114 | OFF | ON  | ON  | ON  | OFF | OFF | ON  | OFF |
| 115 | OFF | ON  | ON  | ON  | OFF | OFF | ON  | ON  |
| 116 | OFF | ON  | ON  | ON  | OFF | ON  | OFF | OFF |
| 117 | OFF | ON  | ON  | ON  | OFF | ON  | OFF | ON  |
| 118 | OFF | ON  | ON  | ON  | OFF | ON  | ON  | OFF |
| 119 | OFF | ON  | ON  | ON  | OFF | ON  | ON  | ON  |
| 120 | OFF | ON  | ON  | ON  | ON  | OFF | OFF | OFF |
| 121 | OFF | ON  | ON  | ON  | ON  | OFF | OFF | ON  |
| 122 | OFF | ON  | ON  | ON  | ON  | OFF | ON  | OFF |
| 123 | OFF | ON  | ON  | ON  | ON  | ON  | OFF | ON  |
| 124 | OFF | ON  | ON  | ON  | ON  | ON  | OFF | OFF |
| 125 | OFF | ON  | ON  | ON  | ON  | ON  | OFF | ON  |
| 126 | OFF | ON  | ON  | ON  | ON  | ON  | ON  | OFF |
| 127 | OFF | ON  | ON  | ON  | ON  | ON  | ON  | ON  |
| 128 | ON  | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| 129 | ON  | OFF | OFF | OFF | OFF | OFF | OFF | ON  |
| 130 | ON  | OFF | OFF | OFF | OFF | OFF | ON  | OFF |
| 131 | ON  | OFF | OFF | OFF | OFF | OFF | ON  | ON  |
| 132 | ON  | OFF | OFF | OFF | OFF | ON  | OFF | OFF |
| 133 | ON  | OFF | OFF | OFF | OFF | ON  | OFF | ON  |
| 134 | ON  | OFF | OFF | OFF | OFF | ON  | ON  | OFF |
| 135 | ON  | OFF | OFF | OFF | OFF | ON  | ON  | ON  |
| 136 | ON  | OFF | OFF | OFF | ON  | OFF | OFF | OFF |

|     | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 137 | ON  | OFF | OFF | OFF | ON  | OFF | OFF | ON  |
| 138 | ON  | OFF | OFF | OFF | ON  | OFF | ON  | OFF |
| 139 | ON  | OFF | OFF | OFF | ON  | OFF | ON  | ON  |
| 140 | ON  | OFF | OFF | OFF | ON  | ON  | OFF | OFF |
| 141 | ON  | OFF | OFF | OFF | ON  | ON  | OFF | ON  |
| 142 | ON  | OFF | OFF | OFF | ON  | ON  | ON  | OFF |
| 143 | ON  | OFF | OFF | OFF | ON  | ON  | ON  | ON  |
| 144 | ON  | OFF | OFF | ON  | OFF | OFF | OFF | OFF |
| 145 | ON  | OFF | OFF | ON  | OFF | OFF | OFF | ON  |
| 146 | ON  | OFF | OFF | ON  | OFF | OFF | ON  | OFF |
| 147 | ON  | OFF | OFF | ON  | OFF | OFF | ON  | ON  |
| 148 | ON  | OFF | OFF | ON  | OFF | ON  | OFF | OFF |
| 149 | ON  | OFF | OFF | ON  | OFF | ON  | OFF | ON  |
| 150 | ON  | OFF | OFF | ON  | OFF | ON  | ON  | OFF |
| 151 | ON  | OFF | OFF | ON  | OFF | ON  | ON  | ON  |
| 152 | ON  | OFF | OFF | ON  | ON  | OFF | OFF | OFF |
| 153 | ON  | OFF | OFF | ON  | ON  | OFF | OFF | ON  |
| 154 | ON  | OFF | OFF | ON  | ON  | OFF | ON  | OFF |
| 155 | ON  | OFF | OFF | ON  | ON  | OFF | ON  | ON  |
| 156 | ON  | OFF | OFF | ON  | ON  | ON  | OFF | OFF |
| 157 | ON  | OFF | OFF | ON  | ON  | ON  | OFF | ON  |
| 158 | ON  | OFF | OFF | ON  | ON  | ON  | ON  | OFF |
| 159 | ON  | OFF | OFF | ON  | ON  | ON  | ON  | ON  |
| 160 | ON  | OFF | ON  | OFF | OFF | OFF | OFF | OFF |
| 161 | ON  | OFF | ON  | OFF | OFF | OFF | OFF | ON  |
| 162 | ON  | OFF | ON  | OFF | OFF | OFF | ON  | OFF |
| 163 | ON  | OFF | ON  | OFF | OFF | OFF | ON  | ON  |
| 164 | ON  | OFF | ON  | OFF | OFF | ON  | OFF | OFF |
| 165 | ON  | OFF | ON  | OFF | OFF | ON  | OFF | ON  |
| 166 | ON  | OFF | ON  | OFF | OFF | ON  | ON  | OFF |
| 167 | ON  | OFF | ON  | OFF | OFF | ON  | ON  | ON  |
| 168 | ON  | OFF | ON  | OFF | ON  | OFF | OFF | OFF |
| 169 | ON  | OFF | ON  | OFF | ON  | OFF | OFF | ON  |
| 170 | ON  | OFF | ON  | OFF | ON  | OFF | ON  | OFF |
| 171 | ON  | OFF | ON  | OFF | ON  | OFF | ON  | ON  |
| 172 | ON  | OFF | ON  | OFF | ON  | ON  | OFF | OFF |
| 173 | ON  | OFF | ON  | OFF | ON  | ON  | OFF | ON  |
| 174 | ON  | OFF | ON  | OFF | ON  | ON  | ON  | OFF |
| 175 | ON  | OFF | ON  | OFF | ON  | ON  | ON  | ON  |
| 176 | ON  | OFF | ON  | ON  | OFF | OFF | OFF | OFF |
| 177 | ON  | OFF | ON  | ON  | OFF | OFF | OFF | ON  |
| 178 | ON  | OFF | ON  | ON  | OFF | OFF | ON  | OFF |
| 179 | ON  | OFF | ON  | ON  | OFF | OFF | ON  | ON  |
| 180 | ON  | OFF | ON  | ON  | OFF | ON  | OFF | OFF |
| 181 | ON  | OFF | ON  | ON  | OFF | ON  | OFF | ON  |
| 182 | ON  | OFF | ON  | ON  | OFF | ON  | ON  | OFF |
| 183 | ON  | OFF | ON  | ON  | OFF | ON  | ON  | ON  |
| 184 | ON  | OFF | ON  | ON  | ON  | OFF | OFF | OFF |
| 185 | ON  | OFF | ON  | ON  | ON  | OFF | OFF | ON  |
| 186 | ON  | OFF | ON  | ON  | ON  | OFF | ON  | OFF |
| 187 | ON  | OFF | ON  | ON  | ON  | OFF | ON  | ON  |
| 188 | ON  | OFF | ON  | ON  | ON  | ON  | OFF | OFF |
| 189 | ON  | OFF | ON  | ON  | ON  | ON  | OFF | ON  |
| 190 | ON  | OFF | ON  | ON  | ON  | ON  | ON  | OFF |
| 191 | ON  | OFF | ON  | ON  | ON  | ON  | ON  | ON  |
| 192 | ON  | ON  | OFF | OFF | OFF | OFF | OFF | OFF |
| 193 | ON  | ON  | OFF | OFF | OFF | OFF | OFF | ON  |
| 194 | ON  | ON  | OFF | OFF | OFF | OFF | ON  | OFF |
| 195 | ON  | ON  | OFF | OFF | OFF | OFF | ON  | ON  |
| 196 | ON  | ON  | OFF | OFF | OFF | ON  | OFF | OFF |
| 197 | ON  | ON  | OFF | OFF | OFF | ON  | OFF | ON  |
| 198 | ON  | ON  | OFF | OFF | OFF | ON  | ON  | OFF |
| 199 | ON  | ON  | OFF | OFF | OFF | ON  | ON  | ON  |
| 200 | ON  | ON  | OFF | OFF | ON  | OFF | OFF | OFF |
| 201 | ON  | ON  | OFF | OFF | ON  | OFF | OFF | ON  |
| 202 | ON  | ON  | OFF | OFF | ON  | OFF | ON  | OFF |
| 203 | ON  | ON  | OFF | OFF | ON  | OFF | ON  | ON  |
| 204 | ON  | ON  | OFF | OFF | ON  | ON  | OFF | OFF |
| 205 | ON  | ON  | OFF | OFF | ON  | ON  | OFF | ON  |
| 206 | ON  | ON  | OFF | OFF | ON  | ON  | ON  | OFF |
| 207 | ON  | ON  | OFF | OFF | ON  | ON  | ON  | ON  |
| 208 | ON  | ON  | OFF | ON  | OFF | OFF | OFF | OFF |
| 209 | ON  | ON  | OFF | ON  | OFF | OFF | OFF | ON  |
| 210 | ON  | ON  | OFF | ON  | OFF | OFF | ON  | OFF |
| 211 | ON  | ON  | OFF | ON  | OFF | OFF | ON  | ON  |
| 212 | ON  | ON  | OFF | ON  | OFF | ON  | OFF | OFF |

|     | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 213 | ON  | ON  | OFF | ON  | OFF | ON  | OFF | ON  |
| 214 | ON  | ON  | OFF | ON  | OFF | ON  | ON  | OFF |
| 215 | ON  | ON  | OFF | ON  | OFF | ON  | ON  | ON  |
| 216 | ON  | ON  | OFF | ON  | ON  | OFF | OFF | OFF |
| 217 | ON  | ON  | OFF | ON  | ON  | OFF | OFF | ON  |
| 218 | ON  | ON  | OFF | ON  | ON  | OFF | ON  | OFF |
| 219 | ON  | ON  | OFF | ON  | ON  | OFF | ON  | ON  |
| 220 | ON  | ON  | OFF | ON  | ON  | ON  | OFF | OFF |
| 221 | ON  | ON  | OFF | ON  | ON  | ON  | OFF | ON  |
| 222 | ON  | ON  | OFF | ON  | ON  | ON  | ON  | OFF |
| 223 | ON  | ON  | OFF | ON  | ON  | ON  | ON  | ON  |
| 224 | ON  | ON  | ON  | OFF | OFF | OFF | OFF | OFF |
| 225 | ON  | ON  | ON  | OFF | OFF | OFF | OFF | ON  |
| 226 | ON  | ON  | ON  | OFF | OFF | OFF | ON  | OFF |
| 227 | ON  | ON  | ON  | OFF | OFF | OFF | ON  | ON  |
| 228 | ON  | ON  | ON  | OFF | OFF | ON  | OFF | OFF |
| 229 | ON  | ON  | ON  | OFF | OFF | ON  | OFF | ON  |
| 230 | ON  | ON  | ON  | OFF | OFF | ON  | ON  | OFF |

|     | SW1 | SW2 | SW3 | SW4 | SW5 | SW6 | SW7 | SW8 |
|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 231 | ON  | ON  | ON  | OFF | OFF | ON  | ON  | ON  |
| 232 | ON  | ON  | ON  | OFF | ON  | OFF | OFF | OFF |
| 233 | ON  | ON  | ON  | OFF | ON  | OFF | OFF | ON  |
| 234 | ON  | ON  | ON  | OFF | ON  | OFF | ON  | OFF |
| 235 | ON  | ON  | ON  | OFF | ON  | OFF | ON  | ON  |
| 236 | ON  | ON  | ON  | OFF | ON  | ON  | OFF | OFF |
| 237 | ON  | ON  | ON  | OFF | ON  | ON  | OFF | ON  |
| 238 | ON  | ON  | ON  | OFF | ON  | ON  | ON  | OFF |
| 239 | ON  | ON  | ON  | OFF | ON  | ON  | ON  | ON  |
| 240 | ON  | ON  | ON  | ON  | OFF | OFF | OFF | OFF |
| 241 | ON  | ON  | ON  | ON  | OFF | OFF | OFF | ON  |
| 242 | ON  | ON  | ON  | ON  | OFF | OFF | ON  | OFF |
| 243 | ON  | ON  | ON  | ON  | OFF | OFF | ON  | ON  |
| 244 | ON  | ON  | ON  | ON  | OFF | ON  | OFF | OFF |
| 245 | ON  | ON  | ON  | ON  | OFF | ON  | OFF | ON  |
| 246 | ON  | ON  | ON  | ON  | OFF | ON  | ON  | OFF |
| 247 | ON  | ON  | ON  | ON  | OFF | ON  | ON  | ON  |

Tab. 3.e

The communication status is displayed by L1 and L2 once the system is set up and the supervisor is active. See the LED status table for more details.

A serial communication error diagnostic function is provided within the instrument

## 3.4 Instrument calibration

There are several methods of instrument calibration, the main ones are described below.

### AUTOMATIC CO2 CALIBRATION

The minimum CO<sub>2</sub> concentration in a clean, non-industrialised outdoor environment is approximately 350ppm. The gas exchange in the sensor element is by diffusion. According to a change in concentration and the speed of the airflow around the sensor, it may take some time for the device to react to the change in concentration. It is essential to choose a well-ventilated installation site for the device.

The automatic calibration provided by the instrument is a suitable mechanism for use in applications where the CO<sub>2</sub> concentration falls to the air level background value (350 - 400 ppm) at least three times in 7 days. This should generally occur when the rooms are unoccupied.

The deviation errors remain minimal if the sensor is exposed to fresh air at least 4 times in 21 days.

The device reaches the correct measurement after 24 hours of continuous operation.

### MANUAL CALIBRATION OF CO2 INSTRUMENT WALL VERSION (duct to be tested)

The sensor has a periodic automatic calibration function. It is advisable to carry out periodic manual calibration if there is insufficient ventilation where the instrument is mounted. Proceed as follows to proceed with manual calibration:

1. Ventilate the area where the instrument is mounted. The CO<sub>2</sub> concentration should be below 500ppm, before during and immediately after the calibration procedure.
2. The calibration procedure is activated by pressing button T1, LED L3 starts flashing. For product versions with display, the message "AUTO 0" appears at the bottom and the character C on the right of the display.

Keep the button pressed until L3 is always lit. For versions with display, a counter appears with the word "CAL0" at the bottom and the character C on the right of the display. Wait 10 minutes for the procedure to finish. In this stage, it is recommended to move away from the instrument to minimise the CO<sub>2</sub> value.

### AUTOMATIC VOC CALIBRATION

The automatic VOC calibration works correctly if the sensor is installed in an area where there is complete ventilation for at least 20 minutes every week.

In this way, the minimum value for air quality is saved after 3 weeks. This mechanism not only allows accurate measurement but also eliminates long-term measurement errors due to sensor ageing.

### MANUAL VOC CALIBRATION INSTRUMENT WALL VERSION (duct to be tested)

The sensor has a periodic automatic calibration function. It is advisable to carry out periodic manual calibration if there is insufficient ventilation where the instrument is mounted. Proceed as follows to proceed with manual calibration:

1. Ventilate the area where the instrument is mounted so that the VOC concentration is as low as possible, before during and immediately after the calibration procedure.
2. The calibration procedure is activated by pressing the button T2, LED L4 starts flashing. For product versions with display, the message "AUTO 0" appears at the bottom and the character V on the right of the display.

Keep the button pressed until L4 stays lit. For versions with display, a counter appears with the word "CAL0" at the bottom and the character V on the right of the display. Wait 60 seconds for the procedure to finish.

LED meaning

| LED | flashing                            | flashing                    | Always off         |
|-----|-------------------------------------|-----------------------------|--------------------|
| L1  | Serial working                      | -                           | Serial not working |
| L2  | Serial connected to the instrument  | -                           | Standard operation |
| L3  | T1 pressed to start CO2 calibration | CO2 calibration in progress | Standard operation |
| L4  | T2 pressed to start VOC calibration | VOC calibration in progress | Standard operation |

Tab. 3.f

### 3.5 Connection to the RS485 supervision network, the typical installation

For correct operation, the IAQ measuring instrument must be connected on the serial line to a supervisor, which can be a pCO or a BOSS family supervisor. Some typical installations for the wall and duct versions of connections between IAQ sensors and the Carel system are shown below.

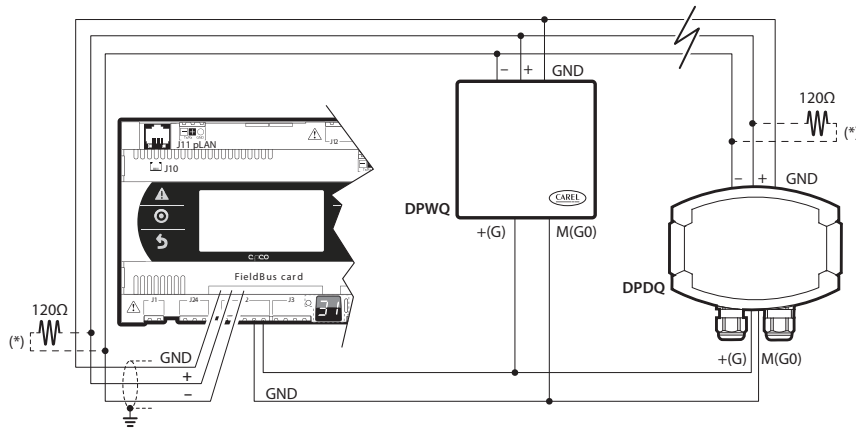


Fig. 3.g

Ⓢ (\*): Note that termination resistors are inserted on the first instrument (typically the pCO) and the last instrument. For the IAQ, it is not necessary to insert it externally and this mode is selected using DIP 1

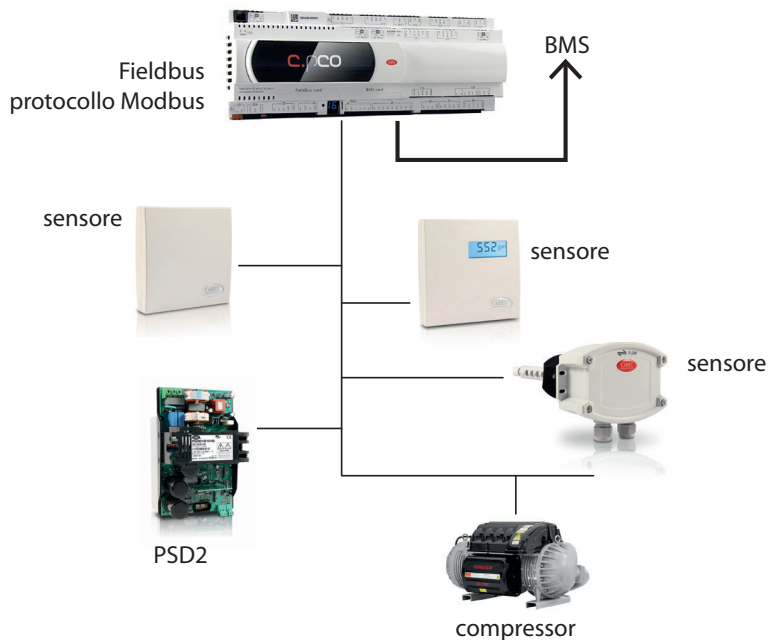


Fig. 3.h

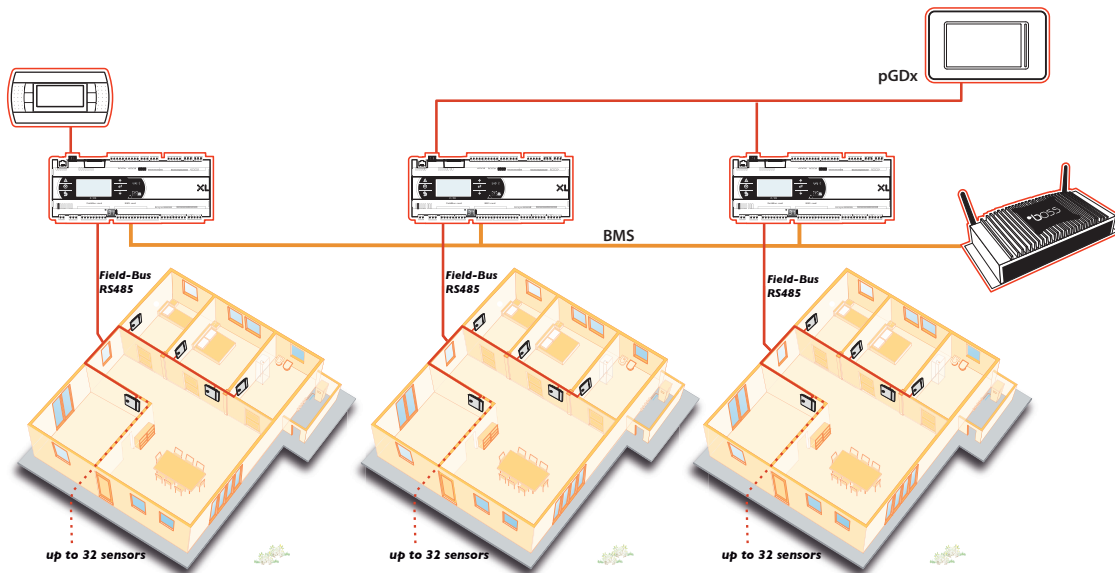


Fig. 3.i

Configuration 1: same power supply for all instruments

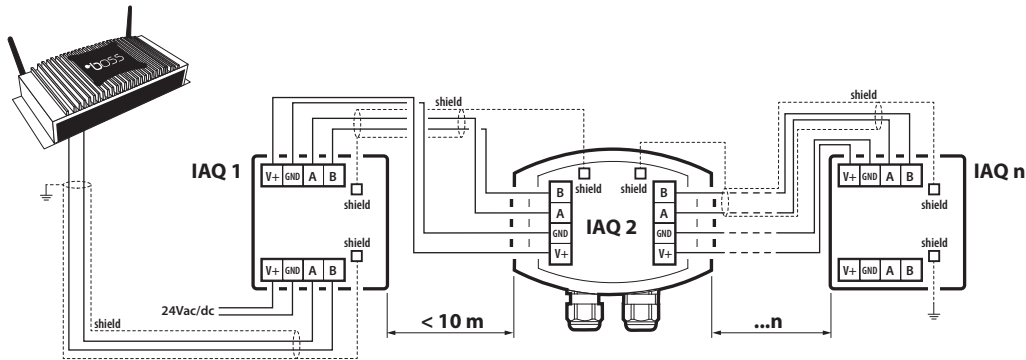


Fig. 3.j

- The power supply must be sized according to the number of connected probes.
- Earthing is also possible on the intermediate nodes to further improve the immunity to the interference of the product.
- Enable the 120-ohm resistor using the DIP switch if node N is the last node in the network, as shown in the figure above.
- This configuration only applies if all the maximum distances between one IAQ and another is less than 10 m.
- The highlighted connections apply to both wall and duct probes.

Configuration 2: One power supply for each instrument

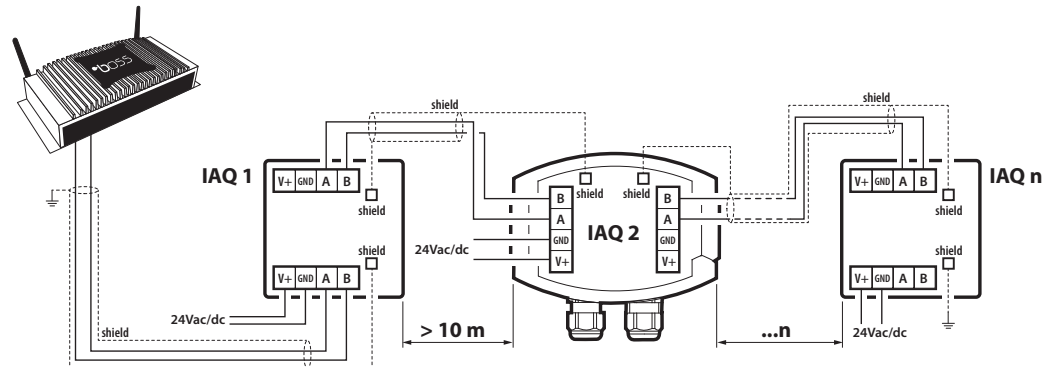
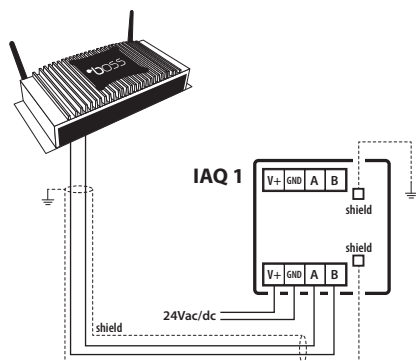
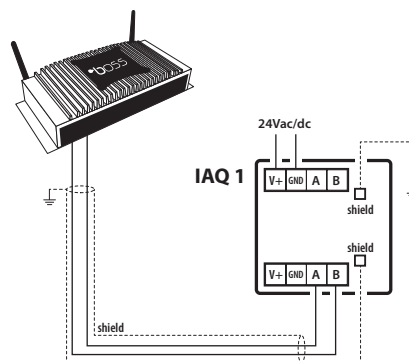


Fig. 3.k

**Configuration 3: Serial and power connected to the same connector**

**Fig. 3.l**
**Configuration 4: Serial connected on one connector, power supply on the other connector**

**Fig. 3.m**

### 3.6 Table of main variables-parameters for serial sensors

The parameters can be accessed via serial line using the Modbus protocol.

The parameters and status variables table is shown below:

#### Wall version variables table

##### Function 04 Read Input Register

| Register | Variable description                 | Data Type       | Default | Saved value | Min. value | Max. value | Min. range | Max. range |
|----------|--------------------------------------|-----------------|---------|-------------|------------|------------|------------|------------|
| 3x0001   | CO2 Value Sampling 4s                | Signed 16 Bit   | -       | -           | 350        | 5000       | 350        | 5000       |
| 3x0002   | CO2 Value Sampling 32s               | Signed 16 Bit   | -       | -           | 350        | 5000       | 350        | 5000       |
| 3x0003   | VOC Value Sampling 4s                | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0004   | VOC Value Sampling 32s               | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0005   | Temperature Value Sampling 4s        | Signed 16 Bit   | -       | -           | 0          | 500        | 0          | 50C        |
| 3x0006   | Temperature Value Sampling 32s       | Signed 16 Bit   | -       | -           | 0          | 500        | 0          | 50C        |
| 3x0007   | Relative humidity Value Sampling 4s  | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0008   | Relative humidity Value Sampling 32s | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0009   | RESERVED                             | -               | -       | -           | -          | -          | -          | -          |
| 3x0010   | RESERVED                             | -               | -       | -           | -          | -          | -          | -          |
| 3x0011   | RESERVED                             | -               | -       | -           | -          | -          | -          | -          |
| 3x0012   | VOC Value Sampling 4s                | Unsigned 16 bit | -       | -           | 0          | 60000      | 0          | 60000 ppb  |
| 3x0013   | VOC Value Sampling 32s               | Unsigned 16 bit | -       | -           | 0          | 60000      | 0          | 60000 ppb  |
| 3x0014   | Particles Value Sampling 4s          | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 1000 µg/m3 |
| 3x0015   | Particles Value Sampling 32s         | Signed 16 Bit   | -       | -           | 0          | 1000       | 0          | 1000 µg/m3 |

##### Function 05 Write Single Coil <sup>(1)</sup>

| Register | Variable description         | Data Type | Default | Saved value | Min. Value | Max. value | Min. range | Max. range |
|----------|------------------------------|-----------|---------|-------------|------------|------------|------------|------------|
| 0x0001   | Reset (Auto zero) CO2        | Bit 0     | 0       | NO          | 0          | 1          | OFF        | ON         |
| 0x0002   | Reset (Auto zero) VOC        | Bit 1     | 0       | NO          | 0          | 1          | OFF        | ON         |
| 0x0003   | Automatic calibration CO2    | Bit 2     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0004   | RESERVED                     | Bit 3     | -       | -           | 0          | 1          | OFF        | ON         |
| 0x0005   | VOC sensibility low          | Bit 4     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0006   | VOC sensibility medium       | Bit 5     | 1       | YES         | 0          | 1          | OFF        | ON         |
| 0x0007   | VOC sensibility high         | Bit 6     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0008   | LCD BACKLIGHT                | Bit 7     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0009   | temperature measurement type | Bit 8     | 0       | YES         | 0          | 1          | °C         | °F         |
| 0x0010   | Particle size measurement    | Bit 9     | 1       | YES         | 0          | 1          | PM 2.5     | PM 10      |

**Function 06 Write Single Register & Function 16 Write Multiple Register <sup>(1)</sup>**

| Register | Variable description   | Data Type      | Default | Saved value | Min. Value | Max. value | Min. range       | Max. range    |
|----------|--|----------------|---------|-------------|------------|------------|------------------|---------------|
| 4x0001   | Physical parameter displayed   | Unsigned 8 bit | 0       | YES         | 0          | 10         | 0                | 10            |
|          | Standard display (cyclic):<br>VOC in %, CO2 in ppm, temperature in °C,<br>relative humidity in % r.H., particulate matter<br>(PM) in µg/m3 | -              | -       | -           | 0          | 0          | Def.<br>Settings | Def. Settings |
|          | Display fixed to CO2 in ppm  | -              | -       | -           | 1          | 1          | 1                | 1             |
|          | Display fixed to VOC in %  | -              | -       | -           | 2          | 2          | 2                | 2             |
|          | Display fixed to Temperature   | -              | -       | -           | 3          | 3          | 3                | 3             |
|          | Display fixed to Relative humidity in % r.H.   | -              | -       | -           | 4          | 4          | 4                | 4             |
|          | Display fixed to Particulate matter (PM) in µg/m   | -              | -       | -           | 6          | 6          | 6                | 6             |
|          | Freely configurable display – 10   | -              | -       | -           |            |            |                  |               |
| 4x0002   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0003   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0004   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0005   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0006   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0007   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0008   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0009   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0010   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0011   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0012   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0020   | Brightness LCD-backlighting  | Unsigned 8 Bit | 100     | YES         | 0          | 63         | 0                | 100%          |
| 4x0021   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0022   | RESERVED   | -              | -       | -           |            |            |                  |               |
| 4x0023   | Offset Temperature   | Signed 10 Bit  | 0       | YES         | -100       | 100        | -10K             | +10K          |
| 4x0024   | Offset Humidity  | Signed 10 Bit  | 0       | YES         | -100       | 100        | -10%             | +10%          |

**Function 08 Diagnostics**

| Sub Function Code | Parameter  | Data Type       | ANSWER                         |
|-------------------|--|-----------------|--------------------------------|
| 00                | Echo of transmission data (Loopback)                       |                 | Echo data                      |
| 01                | Restart Modbus (Reset listen-only mode)                    |                 | Echo message                   |
| 04                | Activation listen-only mode                                |                 | No answer                      |
| 10                | Delete counter   |                 | Echo telegram                  |
| 11                | Counter bus telegrams                                      | Unsigned 16 bit | All valid bus messages         |
| 12                | ter communication errors (Parity, CRC, frame errors, etc.) | Unsigned 16 bit | Faulty bus messages            |
| 13                | Counter exception messages                                 | Unsigned 16 bit | Error counter                  |
| 14                | Counter slave messages                                     | Unsigned 16 bit | Slave messages                 |
| 15                | Counter messages without answer                            | Unsigned 16 bit | Broadcast messages (address 0) |

**Function 17 Report Slave ID**

| Sub Function Code | Parameter                   | Data Type      | ANSWER  |
|-------------------|-----------------------------|----------------|---|
| 00                | Number of bytes             | Unsigned 8 bit | 6   |
| 01                | Slave ID (device type)      | Unsigned 8 bit | AERSGARD® MODBUS<br>19 = T,H,C<br>20 = T,H<br>T: temperature<br>H: relative humidity<br>C: carbon dioxide (CO2) |
| 02                | Slave ID (device class)     | Unsigned 8 bit | 60 = AERASGARD® / AERASREG®   |
| 03                | 03 Status                   | Unsigned 8 bit | 255 = RUN, 0 = STOP   |
| 04                | 04 Version number (release) | Unsigned 8 bit | 1 - 9   |
| 05                | 05 Version number (version) | Unsigned 8 bit | 1...99  |
| 06                | 06 Version number (index)   | Unsigned 8 bit | 1   |

Tab. 3.g



**Duct version variables table**
**Function 04 Read Input Register**

| Register | Variable description                 | Data Type     | Default | Saved value | Min. Value | Max. value | Min. range | Max. range |
|----------|--------------------------------------|---------------|---------|-------------|------------|------------|------------|------------|
| 3x0001   | CO2 Value Sampling 4s                | Signed 16 Bit | -       | -           | 350        | 5000       | 350        | 5000       |
| 3x0002   | CO2 Value Sampling 32s               | Signed 16 Bit | -       | -           | 350        | 5000       | 350        | 5000       |
| 3x0003   | RESERVED                             |               | -       | -           |            |            |            |            |
| 3x0004   | RESERVED                             |               | -       | -           |            |            |            |            |
| 3x0005   | Temperature Value Sampling 4s        | Signed 16 Bit | -       | -           | -350       | 800        | -35C       | +80C       |
| 3x0006   | Temperature Value Sampling 32s       | Signed 16 Bit | -       | -           | -350       | 800        | -35C       | +80C       |
| 3x0007   | Relative humidity Value Sampling 4s  | Signed 16 Bit | -       | -           | 0          | 1000       | 0          | 100%       |
| 3x0008   | Relative humidity Value Sampling 32s | Signed 16 Bit | -       | -           | 0          | 1000       | 0          | 100%       |

**Function 05 Write Single Coil <sup>(1)</sup>**

| Register | Variable description         | Data Type | Default | Saved value | Min. Value | Max. value | Min. range | Max. range |
|----------|------------------------------|-----------|---------|-------------|------------|------------|------------|------------|
| 0x0001   | Reset (Auto zero) CO2        | Bit 0     | 0       | NO          | 0          | 1          | OFF        | ON         |
| 0x0002   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0003   | Automatic calibration CO2    | Bit 2     | 0       | YES         | 0          | 1          | OFF        | ON         |
| 0x0004   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0005   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0006   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0007   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0008   | RESERVED                     |           | -       | -           |            |            |            |            |
| 0x0009   | temperature measurement type | Bit 8     | 0       | YES         | 0          | 1          | °C         | °F         |

**Function 06 Write Single Register & Function 16 Write Multiple Register <sup>(1)</sup>**

| Register | Variable description | Data Type     | Default | Saved value | Min. Value | Max. value | Min. range | Max. range |
|----------|----------------------|---------------|---------|-------------|------------|------------|------------|------------|
| 4x0023   | Offset Temperature   | Signed 10 Bit | 0       | YES         | -100       | 100        | -10K       | +10K       |
| 4x0024   | Offset Humidity      | Signed 10 Bit | 0       | YES         | -100       | 100        | -10%       | +10%       |

**Function 08 Diagnostics**

| Sub Function Code | Parameter  | Data Type       | ANSWER                         |
|-------------------|--|-----------------|--------------------------------|
| 00                | Echo of transmission data (Loopback)                           |                 | Echo data                      |
| 01                | Restart Modbus (Reset listen-only mode)                        |                 | Echo message                   |
| 04                | Activation listen-only mode                                    |                 | No answer                      |
| 10                | Delete counter   |                 | Echo telegram                  |
| 11                | Counter bus telegrams  | Unsigned 16 bit | All valid bus messages         |
| 12                | Counter communication errors (Parity, CRC, frame errors, etc.) | Unsigned 16 bit | Faulty bus messages            |
| 13                | Counter exception messages                                     | Unsigned 16 bit | Error counter                  |
| 14                | Counter slave messages   | Unsigned 16 bit | Slave messages                 |
| 15                | Counter messages without answer                                | Unsigned 16 bit | Broadcast messages (address 0) |

**Function 17 Report Slave ID**

| Sub Function Code | Parameter                   | Data Type      | ANSWER  |
|-------------------|-----------------------------|----------------|---|
| 00                | Number of bytes             | Unsigned 8 bit | 6   |
| 01                | Slave ID (device type)      | Unsigned 8 bit | AERSGARD® MODBUS<br>17 = T,H,V,P,C<br>18 = T,H,V,C<br>19 = T,H,C<br>20 = T,H<br>21 = T,H,P<br>T: temperature<br>H: relative humidity<br>V: air quality (VOC)<br>P: particulate matter (PM)<br>C: carbon dioxide (CO2) |
| 02                | Slave ID (device class)     | Unsigned 8 bit | 60 = AERASGARD® / AERASREG®   |
| 03                | 03 Status                   | Unsigned 8 bit | 255 = RUN, 0 = STOP   |
| 04                | 04 Version number (release) | Unsigned 8 bit | 1 - 9   |
| 05                | 05 Version number (version) | Unsigned 8 bit | 1...99  |
| 06                | 06 Version number (index)   | Unsigned 8 bit | 1   |

**Tab. 3.h**

**(1)**: "write-only" variables that can be set to the desired value on Modbus supervision systems but their value cannot be read. For Carel supervisors, these variables are displayed in the "value" field with "\*\*\*\*" symbols unless they are set to a new value. In these cases, the "value" field indicates the number sent in programming to the probe until the next restart.

### 3.7 Sensor element chemical compatibility table

The sensor elements have undergone chemical compatibility testing.

| Chemical Load                             | %RH    | T      |
|---|--------|--------|
| Diesel                                    | OK (1) | OK (1) |
| Biodiesel                                 | OK     | OK     |
| Ethanol(pure)                             | OK     | OK     |
| Isopropanol                               | OK     | OK     |
| Cockpit spray                             | OK     | OK     |
| Protective lacquer                        | OK     | OK     |
| Protective lacquer remover                | OK     | OK     |
| Refreshment containing caffeine and sugar | OK     | OK     |
| Cold cleaning agent                       | OK     | OK     |
| Spiritus                                  | OK     | OK     |
| Car wash cleaner                          | OK     | OK     |
| Glass cleaner                             | OK     | OK     |
| Interior cleaner                          | OK     | OK     |
| Salt water                                | OK     | OK     |

Tab. 3.i

☛ **Note (1):** OK at 25°C, some cosmetic characteristics may change if used over the entire temperature range.

### 3.8 Technical specification

| Electrical characteristics | Wall version                       | Duct version                        |
|----------------------------|------------------------------------|-------------------------------------|
| Power supply voltage       | 24Vac/Vdc ±10%                     | 24Vac/Vdc ±10%                      |
| Drawn power                | 24Vdc Max. 4.4 W - 24Vac Max 6.4VA | 24Vdc Max. 4.8 W - 24Vac Max. 6.5VA |
| Power frequency            | 50/60Hz                            |                                     |
| Protection class           | III (according to EN60730)         |                                     |

The power source used must be SELV/PELV.

Insert a suitably sized external fuse if the power supply exceeds 15W.

| Temperature sensor characteristics |  |                     |
|------------------------------------|--|---------------------|
| Temperature sensor type            | Digital sensor with low hysteresis, high long-term stability                                 |                     |
| Operating range                    | 0-50°C (32-122°F)  | -20-50°C (-4-122°F) |
| Precision                          | ± 0.2°C 25C (±0.36F 77°F)<br>± 0.8°C (0.44°F) over the entire operating range of the product |                     |

| Humidity sensor characteristics |  |
|---------------------------------|--|
| Type of humidity sensor         | Digital sensor with low hysteresis, high long-term stability               |
| Operating range                 | 0-95 %RH   |
| Precision                       | ± 2 %RH 20-80% 25°C<br>± 5% over the entire operating range of the product |

| Carbon dioxide (CO2) sensor |  |
|-----------------------------|--|
| Sensor type                 | Infrared optic with manual and automatic calibration     |
| Operating range             | 0-5000 ppm   |
| Accuracy                    | ± 3% of the measured value<br>± 0.5% of measured value/C |
| Service life                | 15 years   |
| Sensor stability over time  | Maximum 2% over the service life                         |

| Air quality (VOC) sensor characteristics available for wall versions |   |
|--|---|
| Sensor type  | Metal oxide VOC sensor with automatic calibration |
| Operating range  | 0-100% referred to the calibration gas            |
| Accuracy   | ± 20% referred to the measurement                 |
| Service life   | Greater than 5 years                              |

| Particulate matter (PM) sensor available for wall versions |   |
|--|---|
| Sensor type  | Optical laser   |
| Operating range  | 0-1000 ug/M-3   |
| Type of particulate matter                                 | PM 2.5 0.3-2.5ug<br>PM 10 0.3-10ug                                    |
| Accuracy   | ± 10% of the measured value PM2.5<br>± 25% of the measured value PM10 |
| Service life   | Greater than 10 years   |
| Sensor stability over time                                 | ± 1.25% of the measured value per year                                |

| <b>Other characteristics</b>      |   |   |
|-----------------------------------|---|---|
| Operating temperature             | 0-50C (32-122F)   | -20-50C (-4-122F)                                 |
| Storage temperature               | 0-50C (32-122F)   | -20-50C (-4-122F)                                 |
| Enclosure                         | ABS plastic RAL 9010  | Polyamide PA6                                     |
| External dimensions               | 98 x 98 33mm  | 126 x 90 x 50 mm                                  |
| Installation                      | Wall or panel in vertical position with a ventilation hole at the bottom. | To be installed on the air duct of adequate size. |
| Protection level of the container | IP30  | IP65  |
| Wire section                      | 0.2-1.5mm <sup>2</sup>  |   |
| Software class and structure      | A   |   |
| Communication protocol            | Modbus with address sel. DIP SWITCH from 0 to 247                         |   |
| Sensor response time              | Less than 2 minutes   |   |
| Time for settling measures        | 1 hour after switching on the instrument                                  |   |

**Tab. 3.j**

### 3.8.1 Cleaning and maintenance

When cleaning the instrument do not use ethyl alcohol, hydrocarbons (petrol), ammonia and derivatives. Use neutral detergents and water. Periodically check the aeration slits on the sensor to make sure that air can flow freely through, without obstructions due to impurities or dust in the site of installation.

# 4. INSTALLATION DP-TH SENSORS

## 4.1 Connections for sensors with analogue output

Below are the wiring diagrams showing the connections to the terminal block and the position of the jumpers for configuring the universal voltage or current output (default).

DPW\*\*\*0\*\*\* Out both  
 DPD\*\*\*0\*\*\* 0...1 V - 4...20 mA - 0.5-1 Vdc  
 DPP\*\*\*0\*\*\*

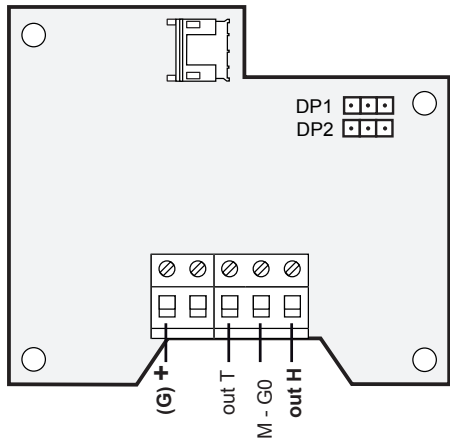


Fig. 4.a

|     |                                     |     |             |                   |
|-----|-------------------------------------|-----|-------------|-------------------|
| DP1 | <input checked="" type="checkbox"/> | ON  | -0.5 to 1 V | R min.<br>1 kohm  |
| DP2 | <input checked="" type="checkbox"/> | OFF |             |                   |
| DP1 | <input checked="" type="checkbox"/> | ON  | -0 to 1 V   | R min.<br>1 kohm  |
| DP2 | <input checked="" type="checkbox"/> | OFF |             |                   |
| DP1 | <input checked="" type="checkbox"/> | ON  | 4 to 20 mA  | R max<br>100 kohm |
| DP2 | <input checked="" type="checkbox"/> | OFF |             |                   |

DPW\*\*\*1\*\*\* Out NTC Res. temperature  
 DPD\*\*\*1\*\*\* 0...1 V - 4...20 mA - 0.5-1 Vdc humidity  
 DPP\*\*\*1\*\*\*

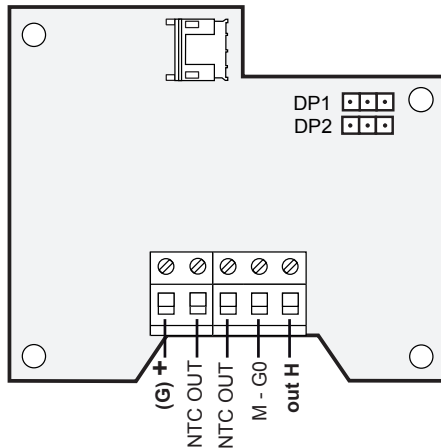


Fig. 4.b

Jumper for configuring the outputs:  
 on models with two active outputs both  
 are configured in the same way.

DPW\*\*\*2\*\*\* Out both  
 DPD\*\*\*2\*\*\* 0...10 V  
 DPP\*\*\*2\*\*\*

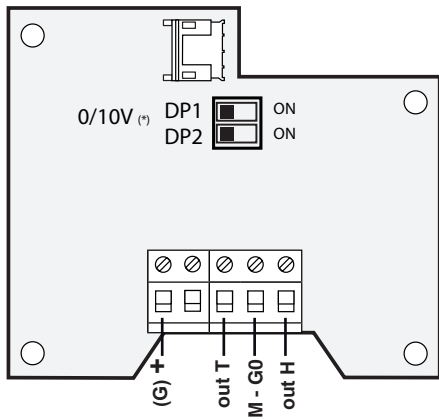


Fig. 4.c

|     |                                     |    |           |                  |
|-----|-------------------------------------|----|-----------|------------------|
| DP1 | <input checked="" type="checkbox"/> | ON | 0 to 10 V | R min.<br>1 kohm |
| DP2 | <input checked="" type="checkbox"/> | ON |           |                  |

(\*) 0-10V Version = default configuration

DPW\*\*\*5\*\*\* Out NTC Res. temperature  
 DPD\*\*\*5\*\*\* 0...10 V humidity  
 DPP\*\*\*5\*\*\*

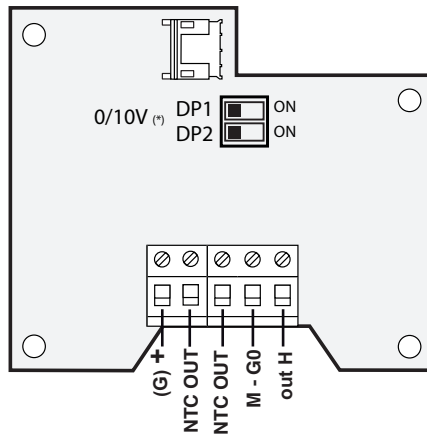


Fig. 4.d

**Key:**

|       |  |
|-------|--|
| out T | temperature output -0.5...1 Vdc o 0...1 Vdc o 4...20 mA for models (DPxxx0 o 1); |
| out T | temperature output 0...10 Vdc for models (DPxxx2 o 5);                           |
| out H | humidity output -0.5...1 Vdc o 0...1 Vdc o 4...20 mA for models (DPxxx0 o 1);    |
| out H | humidity output 0...10 Vdc for models (DPxxx2 o 5);                              |

|         |  |
|---------|--|
| out NTC | output with NTC resistive sensor NTC 10K a 25 °C (standard Carel); |
| M (GO)  | reference for both power supply and outputs                        |
| + (G)   | power supply (12...24 Vac or 8...32 Vdc)                           |

ⓘ Nota:

- with output configured for 0 to 1 Vdc or 0-10Vdc the load must be >1K  $\Omega$ ;
- with output configured for 4 to 20 mA the load must be < 100  $\Omega$ ;
- with NTC resistive output the two signals are isolated from the reference M(G0).

Wiring the sensor to the instrument

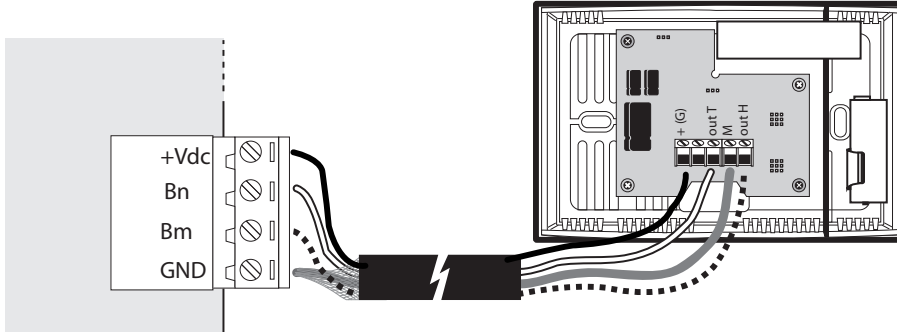


Fig. 4.e

Wiring the sensor to the instrument when an additional external transformer is required

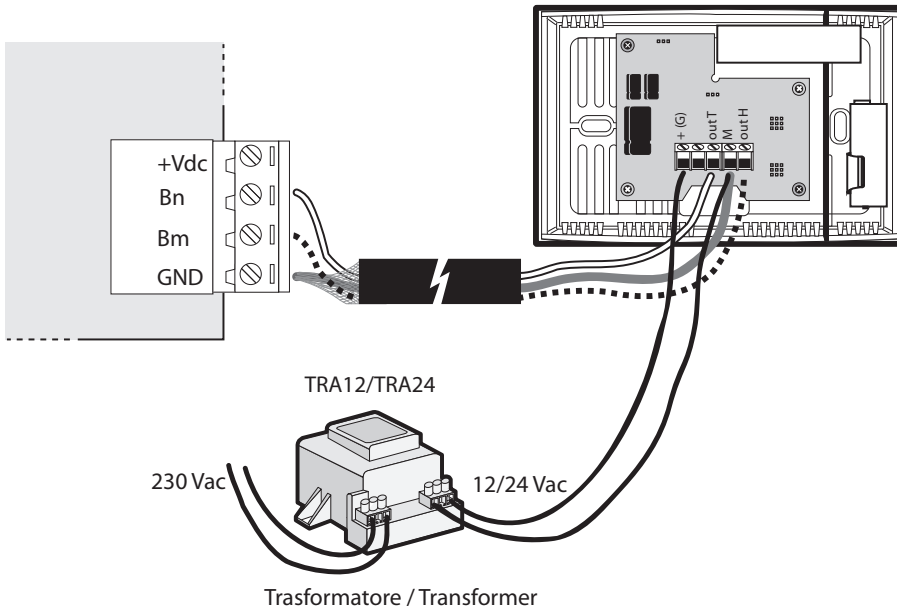


Fig. 4.f

Wiring the sensor with voltage or current output

Sensor connection with voltage or current output and power supply directly from the controller. The power supply capacity (maximum current) of the controller must be evaluated. For distances > 10 metres, the 4...20 mA current connection should be used, to avoid measurement errors due to the drop in the reference M (G0). Sensor connection with separate power supply via transformer, used to avoid measurement errors due to current on reference M(G0) connection or for power supply problems on G0 with earth connection.

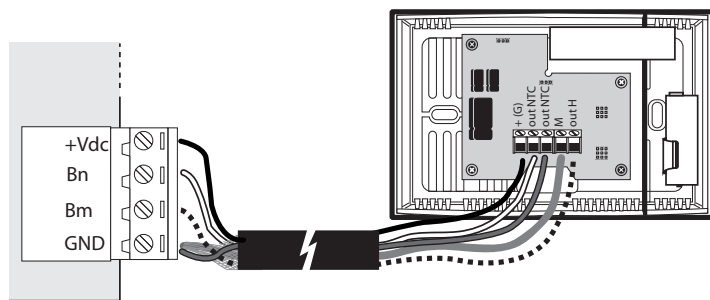


Fig. 4.g

### Wiring the sensor to the instrument with NTC resistive output

Sensor connection with NTC resistive output: the two signals must be connected directly to the terminals on the instrument, Do not use M(G0) as the common for the connection of NTC resistive sensor.

#### Connection wiring diagram

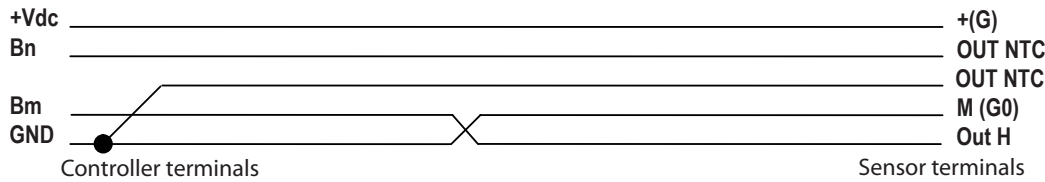


Fig. 4.h

## 4.2 Connections for sensors with RS485 serial output

Below are the wiring diagrams showing the connections to the terminal block, and the settings of the dipswitches for configuring the RS485 serial communication mode with Carel or ModBus protocol.

DPW\*\*\*4\*\*\* Optoinsulated  
 DPD\*\*\*4\*\*\*  
 DPP\*\*\*4\*\*\*

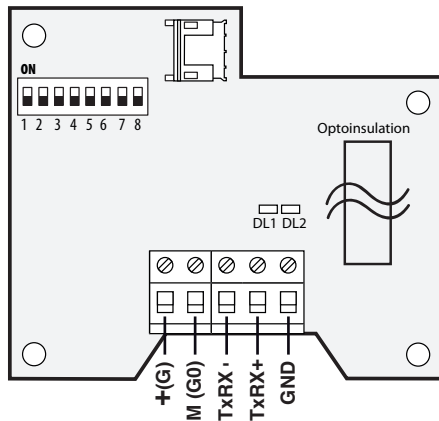


Fig. 4.i

DPW\*\*\*3\*\*\* Not Insulated  
 DPD\*\*\*3\*\*\*  
 DPP\*\*\*3\*\*\*

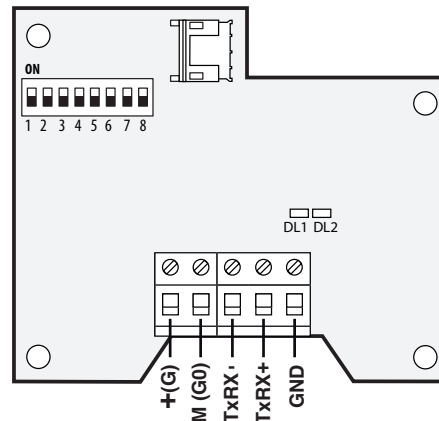


Fig. 4.j

#### Dipswitch settings valid for all models

| Dip-switch 1 to 5 |         | Baud rate        |       |
|-------------------|---------|------------------|-------|
| 1                 | 2 3 4 5 | 6                | 7 8   |
| Address 128 - 159 |         |                  |       |
| RS485 protocol    |         |                  |       |
| ON                |         | CAREL supervisor | 8 N 2 |
| OFF               |         | ModBus®          | 8 N 2 |
| ON                |         | CAREL supervisor | 8 N 2 |
| OFF               |         | ModBus® (***)    | 8 E 1 |
| ON                |         | ModBus®          | 8 E 1 |
| OFF               |         | ModBus®          | 8 E 1 |

#### Key:

- TxRx+ = RS485 serial output positive
- TxRx- = RS485 serial output negative
- GND = reference for RS485 serial connection
- LD1 = Led green RX function
- LD2 = Led yellow TX function
- M(G0) = power supply reference
- +(G) = power supply (12...24 Vac o 18...32 Vdc)

#### Nota:

for the models that are NOT isolated, GND is connected to M(G0)  
 for the optically-isolated models, GND is isolated from M(G0)

The following figure shows the connection between the sensors with serial output and the pCO1 controller, which must be fitted with the PCO100FD10 option.

For the connection to supervisory systems, all the RS485 interfaces featured can be used.

### 4.3 Example of configuring the RS485 serial sensor

The 8 dipswitches (DP2, 8) can be configured to set the address, the serial transmission mode and speed.

- Select address (DIP 1-5). The selection follows the rules of 5-bit binary coding.

Example: Off-Off-Off-Off-Off 128 / On-Off-On-Off-Off 128+5=133;

- CAREL / Modbus® supervisor protocol (or Auto);  
Serial speed (9600/19200 bit/sec);

### 4.4 Example of connection to the RS485 Fieldbus network

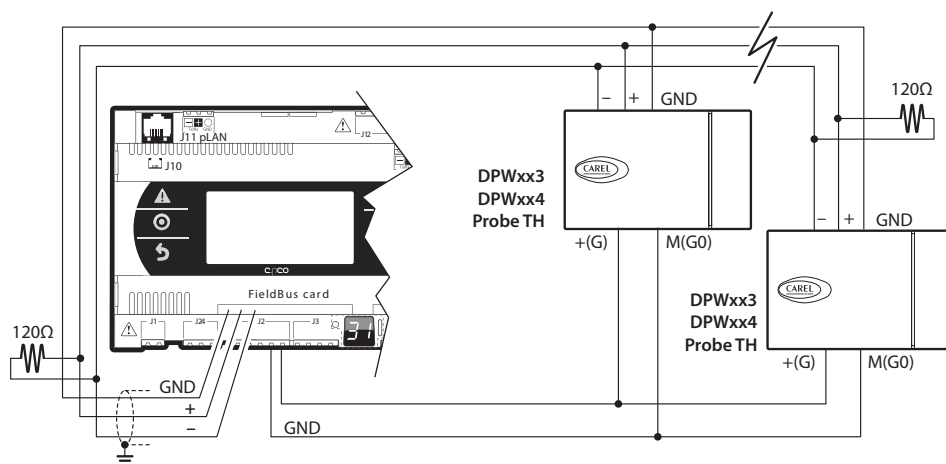


Fig. 4.k

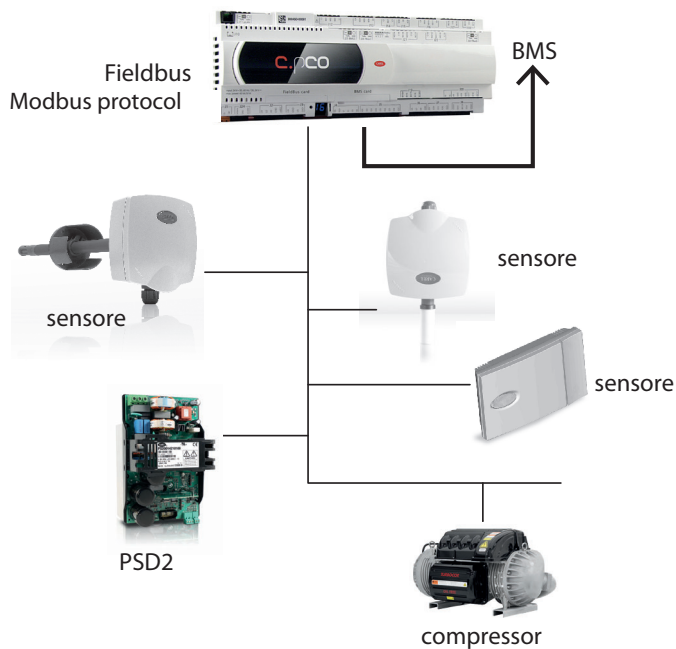


Fig. 4.l

## 4.5 Example of connection to the RS485 supervisor network

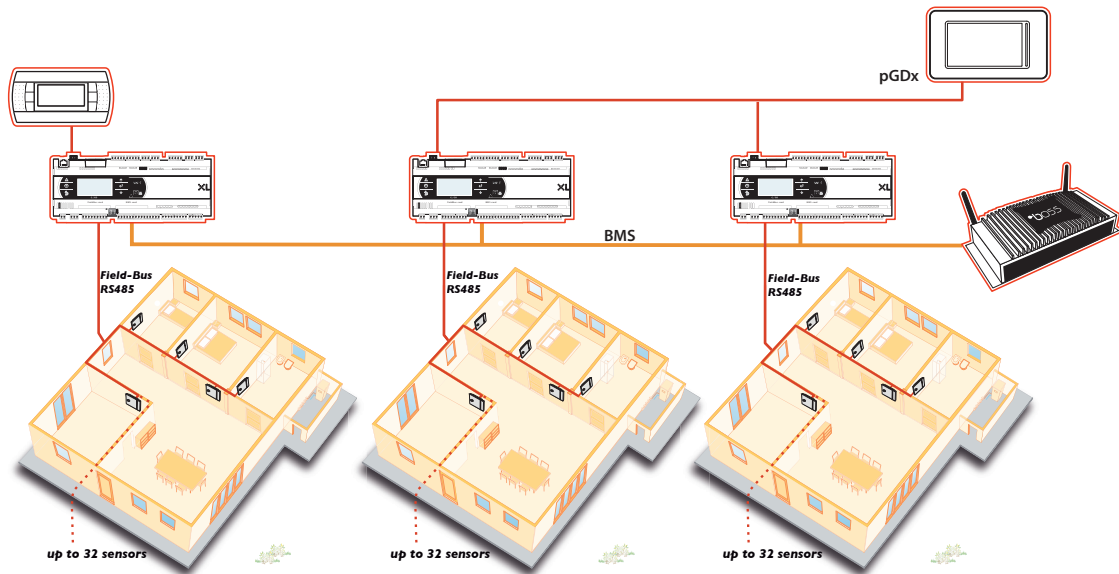


Fig. 4.m

## 4.6 Power supply connection

For alternating current power supply (12...24 Vac), just one transformer can be used, connected to G-G0 on all the sensors with G0 to earth, paying special care to observe the polarity by connecting together the terminals with the same name, or alternatively using an isolating transformer for each individual sensor.

For the serial sensors, the type of power supply depends on the model of sensor used:

- sensors with optical isolation can be powered with one power supply, G-G0, for all the sensors as well as for the controller. In this case, make sure that the cable shield on the controller side is connected to EARTH, directly or via the G0-Earth connection on the controller.
- Sensors that are NOT isolated: for short distances, these can be powered with one power supply, for distances over 10 m, an isolating transformer may be required for each sensor.

## 4.7 Wiring

For wiring a shielded multicore cable with 3 to 5 wires, depending on the model.

The maximum cross-section of the wires allowable for the terminals is 1.5 mm<sup>2</sup>. In versions DPP\* and DPD\*, the maximum inside diameter of the cable gland is 8 mm.

### Serial version with RS485 output

For sensors with serial connection, the cable use must have the following characteristics:

- twisted pair;
- shielded, preferably with earth wire;
- size AWG20 (diam. 0.7 to 0.8 mm; area 0.39 to 0.5 mm<sup>2</sup>) or AWG22 (diam. 0.55 to 0.65 mm; area 0.24 to 0.33 mm<sup>2</sup>);
- rated capacitance between the wires <100 pF/m.

### Analogue version with 0 to 1 Vdc or -0.5 to 1Vdc output signal

On the models with active outputs (not NTC res.) configured for voltage signals, the voltage drop over the cables must be kept in mind: the effect of the drop over 1 mm<sup>2</sup> in cross-section means a variation of 0.015 °C for each metre of cable (0.015 °C m/mm<sup>2</sup>) in the temperature measurement, and a variation of 0.015% rH for each metre of cable (0.015% rH m/mm<sup>2</sup>) in the humidity measurement.

Below is an example that shows the calculation of the variations that cause temperature and humidity errors.



Example:

| Cable length | cable cross-section | Temperature error | Humidity error |
|--------------|---------------------|-------------------|----------------|
| 30 m         | 0,5 mm <sup>2</sup> | 0.9 °C            | 0.9% rH        |
| 30 m         | 1,5 mm <sup>2</sup> | 0.3 °C            | 0.3% rH        |

Tab. 4.k

To avoid measurement errors due to the supply current, an additional power supply from an external transformer can be used (CAREL transformer codes TRA12VDE00 or TRA2400001), to be connected as shown in the figure (2' with transf.). With this configuration the maximum distance is 100 m.

The transformer must not be earthed and can be installed in the panel together with the controller. The connection cable must be multicore with 4 or 5 wires. In this situation, no supply current runs through connection M(G0). In installations with multiple sensors, use a transformer for each sensor to avoid measurement errors.

#### Analogue version with 4 to 20 mA output signal

For distances over 30 m, the current output should be selected, if the system allows.

The maximum installation distance for the current output is 200 m.

In the case of AC power supply, the wires used must have a cross-section of 1.5 mm<sup>2</sup> to reduce noise due to the supply current. Such noise may, in some cases, cause instability in the measurement, which can be eliminated using a DC power supply or with an additional power supply, as shown in the figure (2' with trasf.).

## 4.8 Functional notes DP-TH sensors (with analogue output)

When switched on, the DP sensors (excluding serial and NTC temperature sensors) provide an out-of-range (negative value) output value (voltage or current) that stabilises at the final peak in 20...30 s at the most. Alarms could be generated within the specified time if the controls include out-of-range alarms. For the digital measurement of the signal between the main board and the sensor board, a temperature and humidity measurement refresh period of 15s is used, which may introduce a delay in the reading. If the outputs (voltage and current) are overloaded, the output is reset for a minimum measurement cycle (15s). Communication errors with the sensor board also reset the outputs. The condition with 0V output can be used to manage sensor errors on the controllers, and is available for 0 to 1V, 0 to 10V and 4 to 20mA outputs but not for -0.5 to 1V.

#### WARNING

The sensors are configured by default with 4 to 20mA output. Before connecting to the controller, check the compatibility of the input. To set a different configuration on the sensor, change the default configuration.

On sensors with temperature and humidity output, both channels are configured in the same way, and mixed connections of the outputs are not possible. For 0 to 1V, 0 to 10V and 4 to 20 mA outputs, the start and end scale values are different from the AS\* series analogue sensors (see the table below).

#### Sensors with normalised output: 0...1V / 0...10V / 4...20mA

|            |             |
|------------|-------------|
| -30...70°C | 0...100% RH |
| 0...1V     | 0...1V      |
| 0...10V    | 0...10V     |
| 4...20mA   | 4...20mA    |

#### Sensors with output: -0.5...1V

|             |             |
|-------------|-------------|
| -30...70°C  | 0...100% RH |
| -0.3...0.7V | 0.0...1V    |

Tab. 4.l

Start and end range limits to be set on the controllers. These are independent of the effective range of measurement.

#### Example. For code DPWC110000 (-10...60°C and 10...90% RH)

for 0...1V, 0...10V, 4...20mA outputs set:

|          |                        |     |                          |
|----------|------------------------|-----|--------------------------|
| 0...1V   | 0V at -30°C and 0% RH  | ... | 1V at 70°C and 100% RH   |
| 0...10V  | 0V at -30°C and 0% RH  | ... | 10V at 70°C and 100% RH  |
| 4...20mA | 4mA at -30°C and 0% RH | ... | 20mA at 70°C and 100% RH |

Tab. 4.m

For -0.5 ... 1V output (the limits generally do not need to be set)

|  |                |      |               |
|--|----------------|------|---------------|
|  | -0.3V at -30°C | .... | +0.7V at 70°C |
|  | 0V at 0% RH    | ...  | 1V at 100% RH |

Tab. 4.n

## 4.9 Serial sensors main variables-parameters table

The main characteristic of serial sensors is that they communicate data on the RS485 serial line (which can be configured by a DIP switch). The parameters can be accessed via serial line using the Carel supervisor or Modbus protocols. The machine code of the card is 59 (MAC parameter) The table and status variables are shown below:

| Name | Description  | Read<br>Write | Type<br>A/I/D | U.M.    | #N/D   | Min  | Max  | Def | SPV<br>index | Modbus<br>address |
|------|--|---------------|---------------|---------|--------|------|------|-----|--------------|-------------------|
| OFT  | Temperature offset   | R/W           | A             | °C x 10 | EEPROM | -100 | 100  | 0   | 1            | 0                 |
| OFH  | Humidity offset  | R/W           | A             | % x 10  | EEPROM | -100 | 100  | 0   | 2            | 1                 |
| DLT  | Differential for updating temperature                              | R/W           | A             | °C x 10 | EEPROM | 0    | 20   | 5   | 3            | 2                 |
| DLH  | Differential for updating humidity                                 | R/W           | A             | % x 10  | EEPROM | 0    | 20   | 5   | 4            | 3                 |
| RSV  | Reserved – Not used  | R             | A             | -       | -      | 0    | 0    | -   | (5)          | 4                 |
| TMP  | Temperature value read by the probe                                | R             | A             | °C x 10 | RAM    | -500 | 1000 | -   | 6            | 5                 |
| UMI  | Humidity value read by the probe                                   | R             | A             | % x 10  | RAM    | 0    | 1000 | -   | 7            | 6                 |
| RUG  | Dew point value  | R             | A             | °C x 10 | RAM    | -500 | 2000 | -   | 8            | 7                 |
| DIP  | Describes the status of the DIP switch                             | R             | I             | -       | RAM    | 0    | 255  | -   | 6            | 133               |
| ERR  | Describes the error status for the sensor TH and dew point         | R             | I             | -       | RAM    | 0    | 4095 | -   | 7            | 134               |
| EEP  | Reset default values.<br>1 = default (returns to 0 automatically). | R/W           | D             | -       | RAM    | 0    | 1    | -   | 6            | 5                 |
| ERT  | Temperature sensor reading error                                   | R             | D             | -       | RAM    | 0    | 1    | -   | 7            | 6                 |
| ERH  | Humidity sensor reading error                                      | R             | D             | -       | RAM    | 0    | 1    | -   | 8            | 7                 |
| ETR  | Dew point calculating reading error                                | R             | D             | -       | RAM    | 0    | 1    | -   | 9            | 8                 |

Tab. 4.0

### Note:

- A indicates analogue variables, the value transferred is in tenths (x10);
- D indicates digital variables;
- I indicates integer variables;

### Output variables

|     |  |
|-----|--|
| TMP | analogue value of the temperature read by the sensor;  |
| UMI | analogue value of the relative humidity read by the sensor;  |
| RUG | dew point temperature value (@ std. atm. press.) calculated based on the two temperature and humidity measurements. Range from -20 to +70 °C with humidity from 5 to 95% RH. |
| DIP | describes the status of the DIP switches.  |

### Configuration parameters (saved in Flash / EEPROM)

|     |   |
|-----|---|
| OFT | used to calibrate the external HW connected to the sensor and specifies the offset to add to or subtract from the value read before being sent to the supervisor              |
| OFH | used to calibrate the external HW connected to the sensor and specifies the offset to add to or subtract from the value read before being sent to the supervisor              |
| DLT | The value of the TMP variable is not updated if the temperature does not exceed this differential   |
| DLH | The value of the UMI variable is not updated if the humidity does not exceed this differential, used to limit the number of variations with data transfer on the serial line. |

### Errors: Output variables

|      |   |
|------|---|
| EEP  | digital value for the write error to Flash. Can be written and used to load the default values.   |
| ERT  | indicates that the data relating to the TMP parameter is not correct. This alarm can be generated if the sensor measures a value that is out-of-range or if there is a communication problem. |
| ERH  | indicates that the data relating to the UMI parameter is not correct. This alarm can be generated if the sensor measures a value that is out-of-range or if there is a communication problem. |
| ETR  | indicates that the data relating to the RUG parameter is not correct, generated if ERT and/or ERH are equal to 1.   |
| ERR  | Describes the status of all the alarms, as follows:   |
| Bit0 | The humidity sensor is out-of-range   |
| Bit1 | The UMI parameter is not updated due to I2C communication problems  |
| Bit4 | The temperature sensor is out-of-range  |
| Bit5 | The TMP parameter is not updated due to I2C communication problems  |
| Bit8 | The RUG parameter is not correct due to UMI and TMP being out-of-range  |
| Bit9 | The RUG parameter is not updated due to I2C communication problems  |

## 4.10 General warnings

- To maintain the index of protection declared in the versions with "IP55" case, the wiring must use multicore cables, with the outer sheath having a maximum diameter of 8 mm.
- It is recommended to use shielded cables. The cables carrying the temperature and humidity signals must not run near the 115 to 230 or 400 to 480 Vac power cables, or near cables that power from the contactors to the loads. Measurement errors due to electromagnetic coupling must be avoided.
- The sensor power supply and electrical signals are very low voltage, nonetheless for connection to the controllers, remember that supplementary electrical insulation is required, excluding the "sensor protection" cap. The metal protection of the sensors is connected to the sensor power supply reference. For conformity to the safety standards, double insulation must be used for the power supply to the sensor and the controller it is connected to, if the sensor zone is accessible to the user in the installation.

The sensors can be integrated into Class 1 or 2 equipment, with the following warnings:

### Class I:

the power supply reference G0 must be earthed.

### Class II:

double insulation or reinforced insulation must be used for the power supply to the sensor and the controller it is connected to. If this is not possible, in normal use, the sensor zone must be made inaccessible to the users.

Do not expose to sources of heat or direct sunlight.

**Note:** For the connection of the analogue outputs at distances over 30 m, the installer must make sure that the suitable precautions and protectors specified have been applied in compliance with the standards, so as to avoid faults due to surge. Depending on the installation, the shield of the analogue signal connection cables may need to be earthed.

## 4.11 Sensor element chemical compatibility table

The sensor elements have undergone chemical compatibility testing under ISO 16750-5:2003

Application method: brushing

Rest time: 1 hour

Check: > 24 hours after application

Five (5) samples were tested for each chemical load. After exposure, the samples were checked for:

- relative humidity measurement within specifications;
- temperature measurement within specifications;

| Chemical Load              | %RH | T  | Chemical Load                             | %RH | T  |
|----------------------------|-----|----|---|-----|----|
| Diesel                     | OK  | OK | Refreshment containing caffeine and sugar | OK  | OK |
| Biodiesel                  | OK  | OK | Cold cleaning agent                       | OK  | OK |
| Ethanol(pure)              | OK  | OK | Spiritus                                  | OK  | OK |
| Isopropanol                | OK  | OK | Car wash cleaner                          | OK  | OK |
| Cockpit spray              | OK  | OK | Glass cleaner                             | OK  | OK |
| Protective lacquer         | OK  | OK | Interior cleaner                          | OK  | OK |
| Protective lacquer remover | OK  | OK |   |     |    |

Tab. 4.p

In addition, the following gas concentrations were evaluated regarding their effects on the humidity signal, based on tests and checks in the field.

|             | Effect in gas concentration |                                  |                                      |
|-------------|-----------------------------|----------------------------------|--------------------------------------|
|             | No effect                   | Reversible effect, offset < 5%RH | Non-reversible effect, offset > 5%RH |
| NH3 100 ppm |                             | X                                |                                      |
| CO2 5000ppm | X                           |                                  |                                      |
| NO2 3ppm    |                             | X                                |                                      |
| H2S 1ppm    | X                           |                                  |                                      |
| H2 3500 ppm | X                           |                                  |                                      |
| Cl 1ppm     |                             | X                                |                                      |

Tab. 4.q

## 4.12 Assembly and fastening the instrument

### Wall version

The wall version is wall or panel mounted.

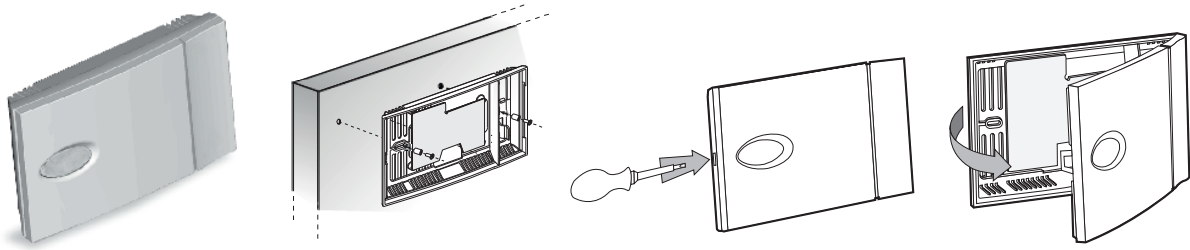


Fig. 4.n

**Note:** assembly

- Open the case using a flathead screwdriver in the slot, paying extra care not to damage the electronic parts;
- Fasten the rear of the sensor case to the panel or the wall (for fastening the case, use the screws supplied with the fastening kit, being careful to use the proper spacers to avoid damaging the electronics of the sensor);
- Close the sensor with the top cover by pressing lightly.

Pay attention not to remove the sensors board from the respective housing and avoid taking away the connector that connects it to the base board.

### Industrial environment version

The industrial environment version is wall or panel mounted.

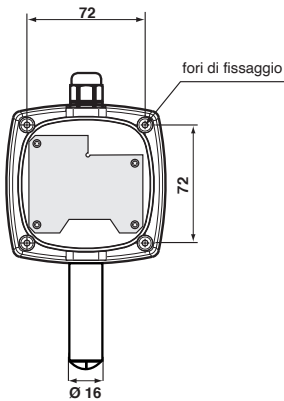


Fig. 4.o

### Assembly notes

1. Open the case by turning the top cover anticlockwise;
2. Fasten the rear of the sensor case to the panel or the wall (use the screws supplied together with the sensor) placing the screws in the holes provided.
3. Make sure that the screws that hold the board protective cover are fastened tightly.
4. Close the sensor by turning the cover clockwise;



Fig. 4.p

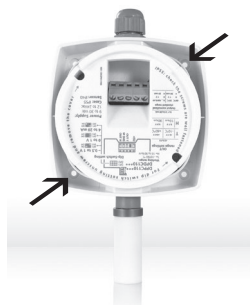


Fig. 4.q

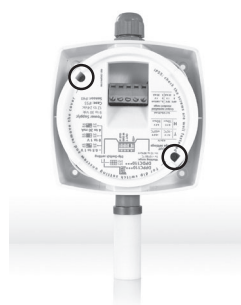


Fig. 4.r



Fig. 4.s

For the electrical connections, remove the top cover of the sensor. For the configuration, see the instructions shown below.

### Duct version

The duct version is connected to the air duct using the special fastening bracket.

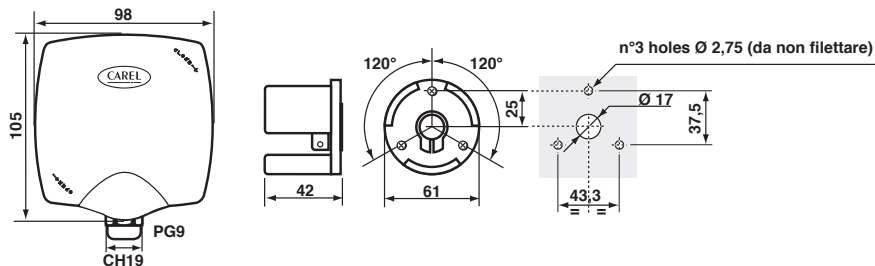


Fig. 4.t

### Assembly notes

- Fasten the bracket to the air duct;
- Insert the rod on the bracket to the required depth;
- Tighten the screw on the bracket to fasten it

For the electrical connections, remove the top cover of the sensor. For the configuration, see the instructions shown below.

## 4.13 Changing the default configuration for the wall sensor and duct sensor

To change the default configuration:

1. Remove the cover by rotating it anticlockwise;
2. Remove the two screws and remove the protective cover;
3. Change the selection pin, according to the required configuration;
4. Place the protective cover and fully tighten the two screws;
5. Close the cover again by rotating it clockwise.

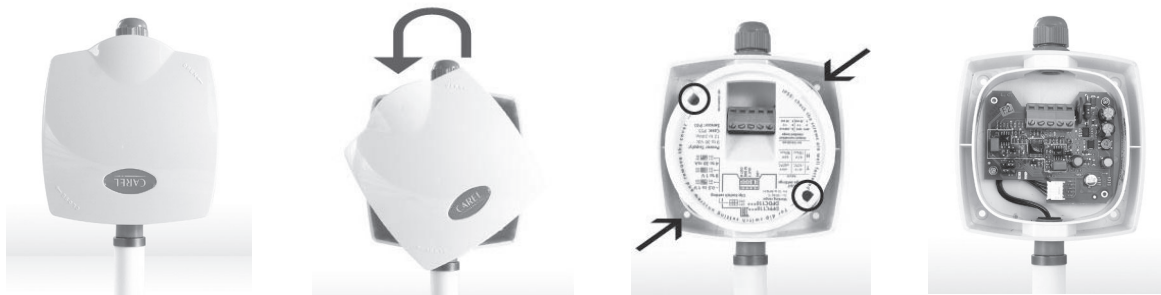


Fig. 4.u

### 4.14 Version with NTC output only

The temperature-only version with NTC resistive output uses an NTC sensor 10K@25°C (beta 3435), see the temperature-resistance table shown below, with the following characteristics of the terminal:

|                           |                     |
|---------------------------|---------------------|
| Rated cross-section       | 2.5mm <sup>2</sup>  |
| Maximum screwdriver size  | 2.8 mm              |
| Terminal plastic material | Polyamide PA6       |
| Terminal                  | Chrome-plated brass |
| Terminal screw            | Chrome-plated steel |

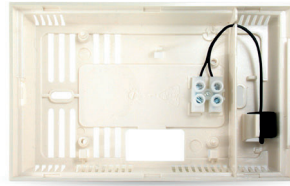
Tab. 4.r

Connection example:  
DPW series wall sensors



Fig. 4.v

Inner view lower shell



Inner view upper shell



DPD series industrial environment sensors



Fig. 4.w

Sensor view without cover



Inner view



DPP series industrial environment sensors



Fig. 4.x

Sensor view without cover



Inner view



## 4.15 Resistance values of the CAREL NTC temperature sensors

| Temp. | Resistance value |        |        | Temp. | Resistance value |       |       | Temp. | Resistance value |      |      |
|-------|------------------|--------|--------|-------|------------------|-------|-------|-------|------------------|------|------|
|       | Max.             | Std    | Min.   |       | Max.             | Std   | Min.  |       | Max.             | Std  | Min. |
| °C    | KΩ               | KΩ     | KΩ     | °C    | KΩ               | KΩ    | KΩ    | °C    | KΩ               | KΩ   | KΩ   |
| -50   | 344,40           | 329,20 | 314,70 | 1     | 26,64            | 26,13 | 25,52 | 56    | 3,49             | 3,42 | 3,35 |
| -49   | 324,70           | 310,70 | 297,20 | 2     | 25,51            | 25,03 | 24,55 | 57    | 3,39             | 3,31 | 3,24 |
| -48   | 306,40           | 293,30 | 280,70 | 3     | 24,24            | 23,99 | 23,54 | 58    | 3,28             | 3,21 | 3,14 |
| -47   | 289,20           | 277,00 | 265,30 | 4     | 23,42            | 22,99 | 22,57 | 59    | 3,18             | 3,11 | 3,04 |
| -46   | 273,20           | 261,80 | 250,60 | 5     | 22,45            | 22,05 | 21,66 | 60    | 3,09             | 3,02 | 2,95 |
| -45   | 258,10           | 247,50 | 237,20 | 6     | 21,52            | 21,15 | 20,78 | 61    | 2,99             | 2,92 | 2,86 |
| -44   | 244,00           | 234,10 | 244,60 | 7     | 20,64            | 20,29 | 19,95 | 62    | 2,90             | 2,83 | 2,77 |
| -43   | 230,80           | 221,60 | 212,70 | 8     | 19,80            | 19,40 | 19,15 | 63    | 2,81             | 2,75 | 2,69 |
| -42   | 218,50           | 209,80 | 201,50 | 9     | 19,00            | 18,70 | 18,40 | 64    | 2,73             | 2,66 | 2,60 |
| -41   | 206,80           | 198,70 | 191,00 | 10    | 18,24            | 17,96 | 17,67 | 65    | 2,65             | 2,58 | 2,52 |
| -40   | 195,90           | 188,40 | 181,10 | 11    | 17,51            | 17,24 | 16,97 | 66    | 2,57             | 2,51 | 2,45 |
| -39   | 185,40           | 178,30 | 171,59 | 12    | 16,80            | 16,55 | 16,31 | 67    | 2,49             | 2,43 | 2,37 |
| -38   | 175,50           | 168,90 | 162,00 | 13    | 16,13            | 15,90 | 15,87 | 68    | 2,42             | 2,36 | 2,30 |
| -37   | 166,20           | 160,10 | 154,10 | 14    | 15,50            | 15,28 | 15,06 | 69    | 2,35             | 2,29 | 2,24 |
| -36   | 157,50           | 151,80 | 140,20 | 15    | 14,89            | 14,68 | 14,48 | 70    | 2,28             | 2,22 | 2,17 |
| -35   | 149,30           | 144,00 | 138,80 | 16    | 14,31            | 14,12 | 13,93 | 71    | 2,21             | 2,16 | 2,10 |
| -34   | 141,60           | 136,60 | 131,80 | 17    | 13,75            | 13,57 | 13,40 | 72    | 2,15             | 2,10 | 2,04 |
| -33   | 134,40           | 129,70 | 125,20 | 18    | 13,22            | 13,06 | 12,89 | 73    | 2,09             | 2,04 | 1,98 |
| -32   | 127,60           | 123,20 | 118,90 | 19    | 12,72            | 12,56 | 12,41 | 74    | 2,03             | 1,98 | 1,93 |
| -31   | 121,20           | 117,10 | 113,10 | 20    | 12,23            | 12,09 | 11,95 | 75    | 1,97             | 1,92 | 1,87 |
| -30   | 115,10           | 111,30 | 107,50 | 21    | 11,77            | 11,63 | 11,57 | 76    | 1,92             | 1,87 | 1,82 |
| -29   | 109,30           | 105,70 | 102,20 | 22    | 11,32            | 11,20 | 11,07 | 77    | 1,86             | 1,81 | 1,78 |
| -28   | 103,80           | 100,40 | 97,16  | 23    | 10,90            | 10,78 | 10,60 | 78    | 1,81             | 1,76 | 1,71 |
| -27   | 98,63            | 95,47  | 92,41  | 24    | 10,49            | 10,38 | 10,27 | 79    | 1,76             | 1,71 | 1,68 |
| -26   | 93,75            | 90,80  | 87,93  | 25    | 10,10            | 10,00 | 9,90  | 80    | 1,71             | 1,66 | 1,62 |
| -25   | 89,15            | 86,39  | 83,70  | 26    | 9,73             | 9,63  | 9,52  | 81    | 1,66             | 1,62 | 1,57 |
| -24   | 84,82            | 82,22  | 79,71  | 27    | 9,38             | 9,28  | 9,18  | 82    | 1,62             | 1,57 | 1,53 |
| -23   | 80,72            | 78,29  | 75,93  | 28    | 9,04             | 8,94  | 8,84  | 83    | 1,57             | 1,53 | 1,49 |
| -22   | 76,85            | 74,58  | 72,36  | 29    | 8,72             | 8,62  | 8,52  | 84    | 1,53             | 1,49 | 1,44 |
| -21   | 73,20            | 71,07  | 68,99  | 30    | 8,41             | 8,31  | 8,21  | 85    | 1,49             | 1,45 | 1,40 |
| -20   | 69,74            | 67,74  | 65,80  | 31    | 8,11             | 8,01  | 7,91  | 86    | 1,45             | 1,41 | 1,37 |
| -19   | 66,42            | 64,54  | 62,72  | 32    | 7,82             | 7,72  | 7,62  | 87    | 1,41             | 1,37 | 1,33 |
| -18   | 63,27            | 61,52  | 59,81  | 33    | 7,55             | 7,45  | 7,35  | 88    | 1,37             | 1,33 | 1,29 |
| -17   | 60,30            | 58,66  | 57,05  | 34    | 7,28             | 7,19  | 7,09  | 89    | 1,34             | 1,30 | 1,26 |
| -16   | 57,49            | 55,95  | 54,44  | 35    | 7,03             | 6,94  | 6,84  | 90    | 1,30             | 1,26 | 1,22 |
| -15   | 54,83            | 53,39  | 51,97  | 36    | 6,79             | 6,69  | 6,60  | 91    | 1,27             | 1,23 | 1,19 |
| -14   | 52,31            | 50,96  | 49,83  | 37    | 6,56             | 6,46  | 6,37  | 92    | 1,23             | 1,20 | 1,16 |
| -13   | 49,93            | 48,65  | 47,12  | 38    | 6,33             | 6,24  | 6,15  | 93    | 1,20             | 1,16 | 1,13 |
| -12   | 47,67            | 46,48  | 45,31  | 39    | 6,12             | 6,03  | 5,94  | 94    | 1,17             | 1,13 | 1,10 |
| -11   | 45,53            | 44,41  | 43,32  | 40    | 5,92             | 5,82  | 5,73  | 95    | 1,14             | 1,10 | 1,07 |
| -10   | 43,50            | 42,25  | 41,43  | 41    | 5,72             | 5,63  | 5,54  | 96    | 1,11             | 1,08 | 1,04 |
| -9    | 41,54            | 40,56  | 39,59  | 42    | 5,53             | 5,43  | 5,35  | 97    | 1,08             | 1,05 | 1,01 |
| -8    | 39,68            | 38,76  | 37,85  | 43    | 5,34             | 5,25  | 5,17  | 98    | 1,05             | 1,02 | 0,99 |
| -7    | 37,91            | 37,05  | 36,20  | 44    | 5,16             | 5,08  | 4,99  | 99    | 1,03             | 0,99 | 0,96 |
| -6    | 36,24            | 35,43  | 34,02  | 45    | 4,99             | 4,91  | 4,82  | 100   | 1,00             | 0,97 | 0,94 |
| -5    | 34,65            | 33,89  | 33,14  | 46    | 4,83             | 4,74  | 4,66  | 101   | 0,98             | 0,94 | 0,91 |
| -4    | 33,14            | 32,43  | 31,73  | 47    | 4,67             | 4,59  | 4,51  | 102   | 0,95             | 0,92 | 0,89 |
| -3    | 31,71            | 31,04  | 30,39  | 48    | 4,52             | 4,44  | 4,36  | 103   | 0,93             | 0,90 | 0,87 |
| -2    | 30,35            | 29,72  | 29,11  | 49    | 4,38             | 4,30  | 4,22  | 104   | 0,91             | 0,87 | 0,84 |
| -1    | 30,00            | 28,47  | 27,89  | 50    | 4,24             | 4,16  | 4,08  | 105   | 0,88             | 0,85 | 0,82 |
| 0     | 27,83            | 27,28  | 26,74  | 51    | 4,10             | 4,02  | 3,95  | 106   | 0,86             | 0,83 | 0,80 |
|       |                  |        |        | 52    | 3,97             | 3,90  | 3,82  | 107   | 0,84             | 0,81 | 0,78 |
|       |                  |        |        | 53    | 3,84             | 3,77  | 3,69  | 108   | 0,82             | 0,79 | 0,76 |
|       |                  |        |        | 54    | 3,72             | 3,65  | 3,57  | 109   | 0,80             | 0,77 | 0,74 |
|       |                  |        |        | 55    | 3,61             | 3,53  | 3,46  | 110   | 0,78             | 0,75 | 0,73 |

Tab. 4.s

## 4.16 Technical specifications

| Power supply  | from 8 to 32 Vdc<br>from 18 to 32 Vdc for 0...10 V output versions<br>12 to 24 Vac tolerance -10%, +15%  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|--|-----|--|-----|-----|-----|-----|-----|-------------------------------------|-----|-------------------------------------|-----|-----|-----|-----|-----|-----|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|---|--|--|--|--|--|--|--|--|--|-----|-----|-----|-----|-----|-----|-----|-----|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Current input (0 to 1V 4-20 mA and 0 to 10V active outputs)   | - 10kΩ load voltage output, 2 Vout outputs max<br>10 mA @ 12 Vdc power supply<br>35 mA, peak @ 24 Vdc power supply<br>- current output, 2 x 20 mA outputs<br>35mA @ 12 Vdc power supply<br>24mA @ 24 Vdc power supply  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AC power consumption (VA)                                     | 50mA @ 12 Vac power supply<br>24mA @ 24 Vac power supply<br>0.6 VA max power consumption / sensor  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Power consumption (RS485 Serial Output) In DC (mA)            | - direct serial version<br>typ. 5 – max 12 mA @ 12 Vdc power supply<br>typ. 4 - max 8 mA @ 24 Vdc power supply<br>- Optically-isolated serial version, typ. - max<br>typ. 14 - max 20mA @ 12 Vdc power supply<br>typ. 9 – max 13 mA @ 24 Vdc power supply  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AC power consumption (VA)                                     | 35 – 49mA RMS @ 12 Vac<br>25 – 33mA RMS @ 24 Vac<br>0.8 VA max power consumption / sensor  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Operating range   | <b>DPW sensors</b><br>Temperature: -10 °C to +60 °C<br>Humidity: 10 to 90 % RH<br><b>DPD and DPP sensors</b><br>Temperature: -20 °C to +70 °C<br>Humidity: from 10 to 90 % RH and from 0 to 100 %RH according to the model   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Precisione  | NTC resistive: ±0.3 °C at 25 °C, ±0.5 °C from 0 °C to 50 °C, ±0.7 °C -20T70 °C   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   | <table border="1"> <thead> <tr> <th>%rH</th> <th colspan="8">10-90% RH sensor (part numbers DP**1*****)</th> <th colspan="8">0-100% RH sensor (codes DP**2*****)</th> </tr> </thead> <tbody> <tr> <td>100</td> <td>3.7</td><td>3.2</td><td>2.7</td><td>2.7</td><td>2.7</td><td>2.7</td><td>3.2</td><td>3.7</td> <td>3.7</td><td>3.2</td><td>2.7</td><td>2.7</td><td>2.7</td><td>2.7</td><td>3.2</td><td>3.7</td> </tr> <tr> <td>90</td> <td>3.2</td><td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.7</td><td>2.7</td><td>3.2</td> <td>3.2</td><td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.7</td><td>3.2</td> </tr> <tr> <td>80</td> <td>3.2</td><td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.7</td><td>2.7</td><td>3.2</td> <td>2.7</td><td>2.2</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.2</td><td>2.2</td><td>2.7</td> </tr> <tr> <td>70</td> <td>3.2</td><td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.7</td><td>2.7</td><td>3.2</td> <td>2.2</td><td>2.2</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.2</td><td>2.2</td> </tr> <tr> <td>60</td> <td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.7</td><td>3.2</td> <td>2.2</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.2</td> </tr> <tr> <td>50</td> <td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>3.2</td> <td>2.2</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td> </tr> <tr> <td>40</td> <td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>3.2</td> <td>2.2</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td> </tr> <tr> <td>30</td> <td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>3.2</td> <td>2.2</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td> </tr> <tr> <td>20</td> <td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>3.2</td> <td>2.2</td><td>2.2</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td><td>2.0</td> </tr> <tr> <td>10</td> <td>3.2</td><td>3.2</td><td>2.7</td><td>2.7</td><td>2.7</td><td>2.7</td><td>2.7</td><td>2.7</td><td>3.2</td> <td>2.7</td><td>2.7</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td><td>2.2</td> </tr> <tr> <td>0</td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td>3.2</td><td>3.2</td><td>2.7</td><td>2.7</td><td>2.7</td><td>2.7</td><td>2.7</td><td>2.7</td> </tr> <tr> <td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table> <p>10-90% RH sensor (part numbers DP**1*****)<br/>HUM: ±2.2% min, see table<br/>TEMP: ±0.6°C @ 25°C; ±0.9°C @ -10T60°C</p> <p>0-100% RH sensor (codes DP**2*****)<br/>HUM: ±2% min, see table<br/>TEMP: ±0.5°C @ 25°C; ±0.9°C @ -20T70°C</p> <p><b>WARNING:</b> Possible variations in the range ± 2°C and ± 5% RH in the presence of strong electromagnetic fields (10V/m)</p> | %rH | 10-90% RH sensor (part numbers DP**1*****) |     |     |     |     |     |                                     |     | 0-100% RH sensor (codes DP**2*****) |     |     |     |     |     |     |  | 100 | 3.7 | 3.2 | 2.7 | 2.7 | 2.7 | 2.7 | 3.2 | 3.7 | 3.7 | 3.2 | 2.7 | 2.7 | 2.7 | 2.7 | 3.2 | 3.7 | 90 | 3.2 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 3.2 | 3.2 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 3.2 | 80 | 3.2 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 3.2 | 2.7 | 2.2 | 2.0 | 2.0 | 2.0 | 2.2 | 2.2 | 2.7 | 70 | 3.2 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 3.2 | 2.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.2 | 60 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 3.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 50 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 40 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 30 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 20 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2 | 2.2 | 2.2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 10 | 3.2 | 3.2 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 3.2 | 2.7 | 2.7 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 0 |  |  |  |  |  |  |  |  |  | 3.2 | 3.2 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| %rH   | 10-90% RH sensor (part numbers DP**1*****)   |     |  |     |     |     |     |     | 0-100% RH sensor (codes DP**2*****) |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 100   | 3.7  | 3.2 | 2.7  | 2.7 | 2.7 | 2.7 | 3.2 | 3.7 | 3.7                                 | 3.2 | 2.7                                 | 2.7 | 2.7 | 2.7 | 3.2 | 3.7 |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 90  | 3.2  | 2.7 | 2.2  | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 3.2                                 | 3.2 | 2.7                                 | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 3.2 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 80  | 3.2  | 2.7 | 2.2  | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 3.2                                 | 2.7 | 2.2                                 | 2.0 | 2.0 | 2.0 | 2.2 | 2.2 | 2.7 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 70  | 3.2  | 2.7 | 2.2  | 2.2 | 2.2 | 2.2 | 2.7 | 2.7 | 3.2                                 | 2.2 | 2.2                                 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 | 2.2 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 60  | 2.7  | 2.2 | 2.2  | 2.2 | 2.2 | 2.2 | 2.2 | 2.7 | 3.2                                 | 2.2 | 2.0                                 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.2 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 50  | 2.7  | 2.2 | 2.2  | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2                                 | 2.2 | 2.0                                 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 40  | 2.7  | 2.2 | 2.2  | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2                                 | 2.2 | 2.0                                 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 30  | 2.7  | 2.2 | 2.2  | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2                                 | 2.2 | 2.0                                 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 20  | 2.7  | 2.2 | 2.2  | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 3.2                                 | 2.2 | 2.2                                 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 10  | 3.2  | 3.2 | 2.7  | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 3.2                                 | 2.7 | 2.7                                 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 | 2.2 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| 0   |  |     |  |     |     |     |     |     |                                     | 3.2 | 3.2                                 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 | 2.7 |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|   |  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Storage   | -20T70 °C ; 10-90% RH non-condensing   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Operation limits  | -10T60 °C; 10-90% RH non-condensing for DPW versions<br>-20T70 °C; 0-100% RH non-condensing for DPD DPP versions   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Temperature sensor  | NTC 10KΩ at 25 °C 1%   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Humidity sensor   | Capacitive sensor  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Humidity output signals                                       | Range 0...100% RH<br>Voltage 10 mV/% RH for 0..1V (Rmin load = 1 kΩ)<br>Voltage 100 mV/% RH for 0..10V (Rmin load = 1 kΩ)<br>Current 4...20mA 4mA=0% RH; 20mA=100% RH (Rmax load = 100 Ω)  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Temperature output signals                                    | Range -30T70°C<br>Voltage 10 mV/% RH for -0.5..1V (Rmin load = 1 kΩ)<br>Voltage for 0 to 1V 0V = -30°C; 1V =+70°C (Rmin load = 1 kΩ)<br>Voltage for 0 to 10V 0V = -30°C; 10V =+70°C (Rmin load = 1 kΩ)<br>Current 4...20 mA 4 mA=-30°C; 20 mA=+70°C (Rmax load = 100Ω)   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Terminal strip  | Screw terminals for cables max. cross-section 1.5 – min. 0.5 mm2   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Case index of protection                                      | IP55 for DPD, DPP (for ducts and industrial environment environment)<br>IP30 for DPW (wall)  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Sensor index of protection                                    | IP54 for DPP<br>IP40 for DPD<br>IP30 for DPW   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Temperature time constant                                     | in still air 300 s<br>in ventilated air (3 m/s) 60 s   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Humidity time constant  | in still air 60 s<br>in ventilated air (3 m/s) 20 s  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Classification according to protection against electric shock | Suitable for integration in Class I and II equipment   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| PTI of the insulating materials                               | 250 V  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Period of stress across the insulating parts                  | Long   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Environmental pollution                                       | Normal   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Category of resistance to heat and fire                       | Category D (for the case and cover)  |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Category (overvoltage immunity)                               | Category 2   |     |  |     |     |     |     |     |                                     |     |                                     |     |     |     |     |     |     |  |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |   |  |  |  |  |  |  |  |  |  |     |     |     |     |     |     |     |     |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

Tab. 4.t



### 4.16.1 Cleaning and maintenance

When cleaning the instrument do not use ethyl alcohol, hydrocarbons (petrol), ammonia and derivatives. Use neutral detergents and water. Periodically check the aeration slits on the sensor to make sure that air can flow freely through, without obstructions due to impurities or dust in the site of installation.

## 4.17 Mechanical dimensions

### 4.17.1 DPW model

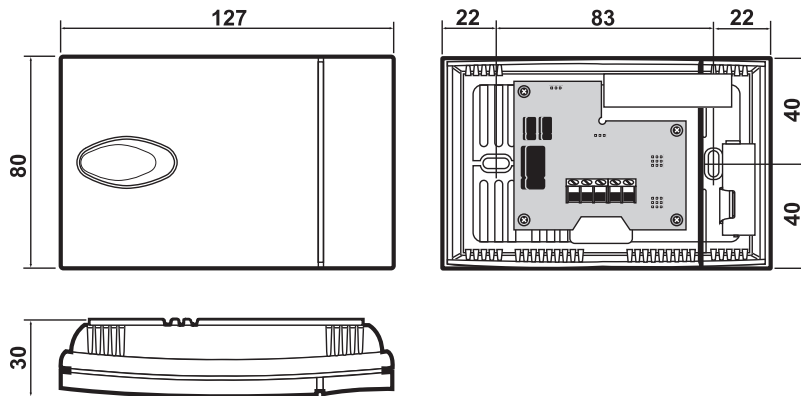


Fig. 4.y

### 4.17.2 DPD model

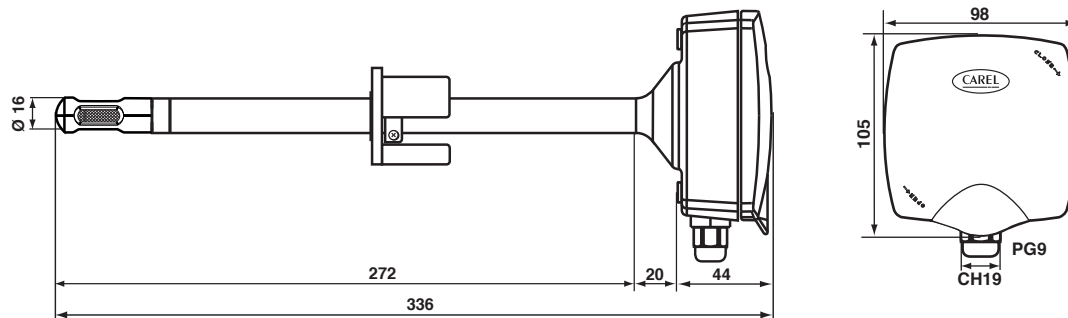


Fig. 4.z

### 4.17.3 DPP model

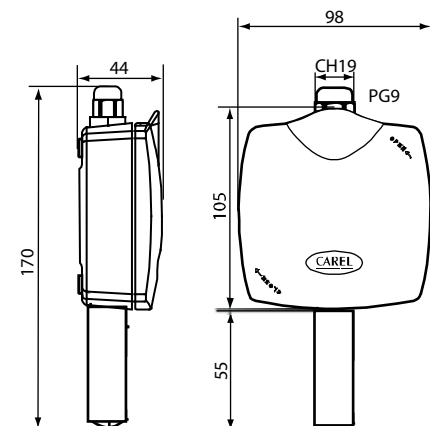


Fig. 4.aa





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