Product description

For use as a room pressure controller for rooms in which constant air pressure must be maintained. Clean rooms or laboratories must be maintained in a state of constant positive or negative pressure relative to neighbouring rooms (e.g. corridor). Depending on the area of application, the infiltration or leakage of contaminated or impure air with excess levels of dust is thus avoided.

PM100 is suitable for monitoring the required negative or positive room pressure and signals when the setpoint that is to be monitored is exceeded or underrun. The setpoint is defined via the digital inputs, by programming via the service module or optionally via the LON network.

The following configurations are available:
- Differential pressure measurement with status display (red/green) and alarm acknowledgement as well as two potential-free contacts for threshold monitoring (optional)
- Differential pressure measurement with status display (red/green) and alarm acknowledgement and numerical display of the the room pressure as well as two potential-free contacts for threshold monitoring(optional)

In addition to the digital display, an external display can be connected as a secondary display.

Functional description

Microprocessor contolled monitoring and alarm system for rooms maintained at constant pressure. A high-speed control algorithm compares the setpoint value with the room pressure measured by the static differential pressure sensor and signals an alarm when the pressure is exceeded or underrun.

The setpoints that are to be monitored are freely programmable and are saved mains voltage failure-safe in the EEPROM.

PM100 uses a special algorithm to automatically recognize the opening of doors and windows and automatically extends the alarm delay time by a programmable time period (default = 10 sec). If, for example, the door is shut again within this time period, monitoring begins again only after the door has been closed. This novel monitoring concept devised by SCHNEIDER reduces false alarms caused by external influences (doors, windows, etc.) and thus significantly increases operating safety.

The SCHNEIDER PM100 can be used for redundant monitoring of an existing room pressure controller (e.g. the SCHNEIDER CRP room pressure controller). During threshold monitoring, the potential-free contacts signal the upper and lower thresholds.

The PM room pressure controller can be connected to the building services management system (BSM) via the optional LON interface, whereby all relevant data and information are available.

PM100-L-1-W-2

LON, FTT-10A

DIS220

PM100-L-1-A-2
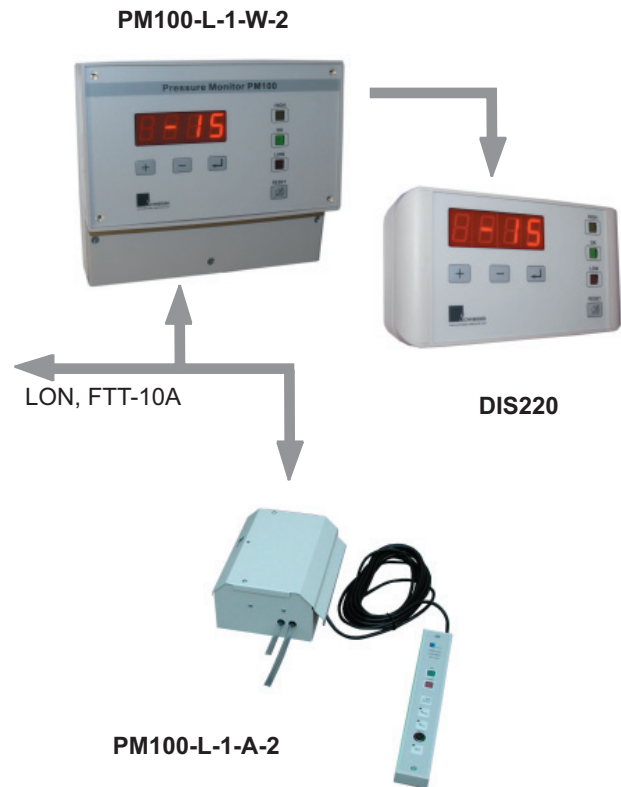
Performance features

- Microprocessor controlled monitoring system
- Digital room pressure display in pascal (optional)
- Additional, external room pressure display in pascal (optional secondary display)
- Threshold monitoring of negative/positive room pressure with alarm and alarm acknowledgement button
- All system data are saved mains voltage failure-safe in the EEPROM
- Free programming of system data via the service module SVM-100, such as alarm delay time, negative/positive room pressure
- Retrieval of all actual values via the LON network (optional)
- Static differential pressure sensor with high long-term stability for continuous measurement of the actual value in the range 5 pa to 100 pa or ± 50 pa (external)
- Monitoring of the customer ventilation system
- Suitable as a redundant negative/positive room pressure controller
- Analogue actual value output 0(2)...10V DC / 10mA
- Two digital inputs for setpoint switching
- Relay contact 1 x A for the upper setpoint
- Relay contact 1 x A for the lower setpoint
- Programming plug on the circuit board
- External customer supply voltage 24V AC
- Integrated power supply 230V AC (optional)

Functional description

Programming

Programming of the setpoints and retrieval of the actual value is done via the service module SVM100, laptop or LON network.

LON network (optional)

Programming of the setpoints and the actual values are available via the LON network as standard variables (SNVT). Malfunctions (e.g. room pressure thresholds exceeded/underrun) are recognized and signalled via the LON network.

The LON network offers maximum flexibility and safety. The connection to the building management system (BMS) enables complete ventilation control and monitoring of all laboratories as well as remote maintenance of the LabSystem product range.

LON Standard Network Variable Type (SNVT)

LONMark specifications are fulfilled, which ensures easy connection of different subsections. LON functionality can be easily retrofitted in all SCHNEIDER products at any time.

Building services management system

The central computer balances the entire ventilation requirements of the building and can also check all room pressure controllers for plausibility.

This concept ensures a very high safety standard for the user. The building management system can be integrated anywhere in the LON network.

All actual, setpoint, alarm and threshold values are available via the optional LON interface and can be integrated in the building services management system.

Overview:
Room pressure controller PM100

PM100-L-1-A-2

PM100-L-1-W-2

LON network, FTT-10A
from/to building management system (BMS)

DIS220
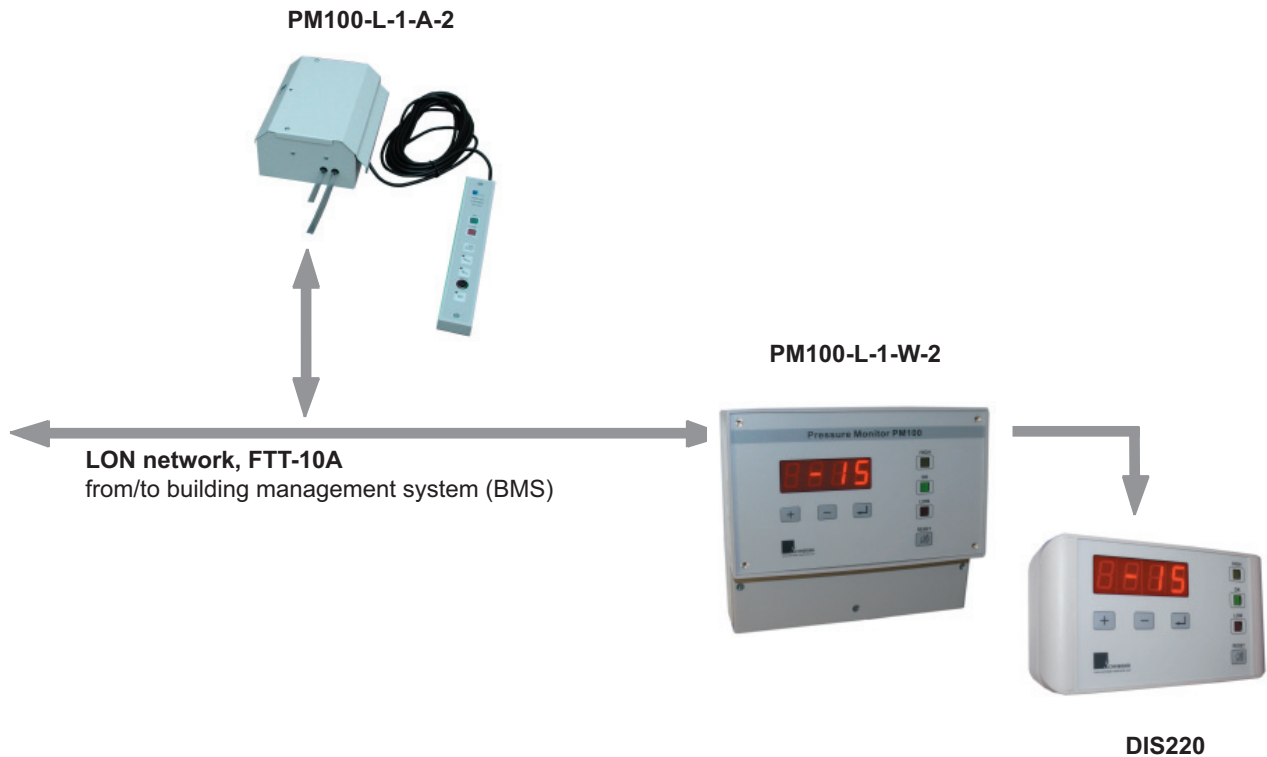
Room pressure controller

During room pressure control the regulated room pressure is redundantly monitored against the digital input 1 and input 2.

The available control levels are shown in Diagram 1 and Table 1. 1-point, 2-point or 3-point operation (setpoints 1 to 3) can easily be implemented by direct activation of the digital inputs.

Setpoints 1 to 3 for monitoring different room pressure values

The room pressure setpoints in Diagram 1 are programmed to the following setpoints:

> **Setpoint 1 = + 40 pascal**
> **Setpoint 2 = + 20 pascal**
> **Setpoint 3 = + 10 pascal**

The room pressure actual value signal (A-Out1) correlates to the measured room pressure.

See Table 1 and the terminal connection schematic plan on page 6 for information on the connecting of the digital inputs.

For air lock pressure controllers, positive and negative room pressure setpoints can be monitored with a suitable differential pressure transmitter (± 50 pascal or - 80 to + 20 pascal).

Alarm thresholds

Two independent alarm thresholds can be programmed with any alarm values within the range ± 30 Pascal. Alarm threshold 1 affects relay 1 and alarm threshold 2 affects relay 2. If the corresponding relay drops out, the alarm threshold is exceeded or underrun and the alarm status is signalled.

The alarm thresholds always relate to the room pressure setpoint that is currently to be regulated.

Example:

> **Alarm threshold 1 = + 5 Pascal**
> **Alarm threshold 2 = - 3 Pascal**
> **Setpoint 1 = + 20 Pascal**
> **Setpoint 2 = - 15 Pascal**

At room pressure control setpoint 1 (+20 pascal), alarm threshold 1 (relay 1 drops out) is exceeded or underrun and signalled at > +25 pascal and alarm threshold 2 (relay 2 drops out) at < +17 Pascal).

At room pressure control setpoint 2 (-15 Pascal), alarm threshold 1 (relay 1 drops out) is exceeded or underrun and signalled at < -10 pascal and alarm threshold 2 (relay 2 drops out) at > -18 pascal.
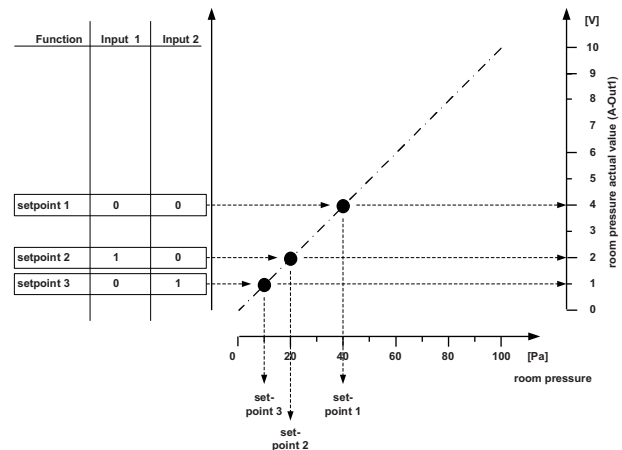
Diagram 1: Room pressure monitor

Table 1: PM monitor setpoints

Function	Digital inputs	
	Input 1	Input 2
Setpoint 1	0	0
Setpoint 2	1	0
Setpoint 3	0	1

When inputs 1 and 2 are not connected (without current), setpoint 1 is regulated.

Alarm delay time

The alarm delay time is freely programmable from 0...240 s. The alarm status must be active for at least this preset time period in order for the alarm to be activated. This delay reduces false alarms, e.g. when the duct system is unstable.

Delay PM/CRP (door recognition)

An additional internal delay period of 0...240 s is started when the differential pressure transmitter detects a sudden change in pressure (e.g. when a door or window is opened). Room pressure control stops and is only started again after this delay period has elapsed.

This prevents false alarms caused by pressure changes when a room is entered. The time taken to open and close a door when the room is entered quickly is less than 10 s. That means that with a PM/CRP delay of e.g. 15 s sudden pressure changes are not signalled within this time.
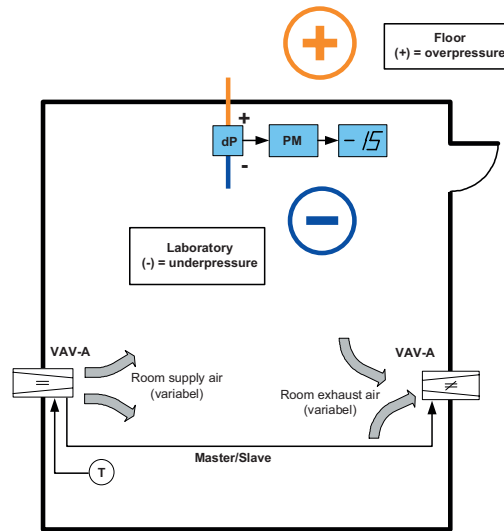
Room plan 1 ● Room pressure control of master/slave regulated rooms

Room plan 1 shows a variable volume flow controller (VAV) for the room supply air, which is activated by a thermal element, for example. Activation via the building services management system (BSM) is also possible. The room supply air and room exhaust air volume flow controllers are connected in master/slave operating mode, i.e. the room exhaust air follows the room supply air to ensure a constant negative pressure.

The PM100 room pressure controller monitors the programmable negative room pressure (-) redundantly, e.g. -15 pa and signals when the value that is to be maintained is exceeded or underrun. The opening and closing of doors within < 10 sec (programmable from 0...240 s) is ignored and does not result in malfunction messages.

An optional LON connection makes the room pressure actual value as well as alarm and status messages available to the building management system via standard network variables (SNVT).

The PM100 room pressure controller can optionally monitor room negative or positive pressure. Of course, the volume flow for the room supply air can also be provided in a 2-stage operating mode (daytime/night-time operation). Laboratories are generally maintained at negative pressure, which prevents the escape of contaminants from the laboratory.
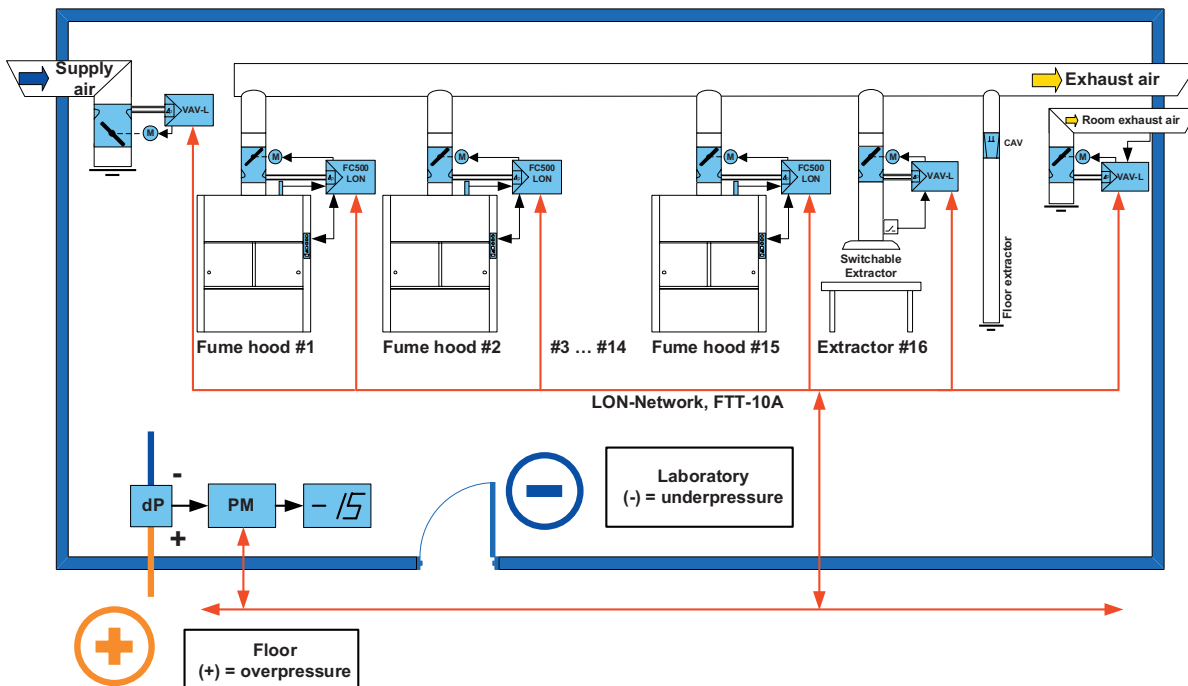

The PM100 static differential pressure transmitter measures the difference between the corridor (+) and the laboratory (-) and generates the actual value signal for the numeric pressure display (e.g. -15 pa).

Room plan 2 ● Room pressure control of laboratories

Room plan 2 shows the connection of up to 16 fume hoods with a sash-dependent FC500 fume hood controller. All fume hood controllers are connected to one another and to the building services management system via the LON network. The room supply air and the additional room exhaust air is variably regulated. Room air replacement is maintained at a constant rate, independent of the fume hood exhaust air, so that negative room pressure is guaranteed in all operating conditions.

The PM100 room pressure controller monitors the programmed negative room pressure (-) redundantly, e.g. -15 pa and maintains it at a constant level. The opening and closing of doors within < 10 s (programmable from 0...240 s) is ignored and does not result in malfunction messages.

An optional LON connection makes the room pressure actual value as well as alarm and status messages available to the building management system via standard network variables (SNVT).

Order code: Room pressure controller / External display

Order code: **Room pressure controller**

PM100 - L - 1 - W - 2

Type

Setpoints/Interface

| LON field bus, FTT-10A | L |
| Analogue input | A |

Differential pressure transmitter

internal, 3...100 pascal	1
external, ± 50 pascal	2
external, - 80...+ 20 pascal	3

Relay equipment

| 0 | no relay |
| 2 | 2 relays for upper and lower threshold alarm |

Case type

| W | Wall-mounted case, with display for pressure in Pa |
| A | Mounting case, without display, with external control panel |

Internal display model:
Numeric room pressure display (3½ digit) in pascal and status display (red, green) with alarm acknowledgement.

External control panel model:
Status display (red, green) with alarm acknowledgement.

Ordering example: Room pressure controller PM100
Room pressure controller with LON module, differential pressure transmitter 5...100 pa, wall-mounted case with internal display and 2 relays for upper and lower thresholds.

Make: **SCHNEIDER**

Type: **PM100-L-1-W-2**

Order code: **External display**

DIS220

Type

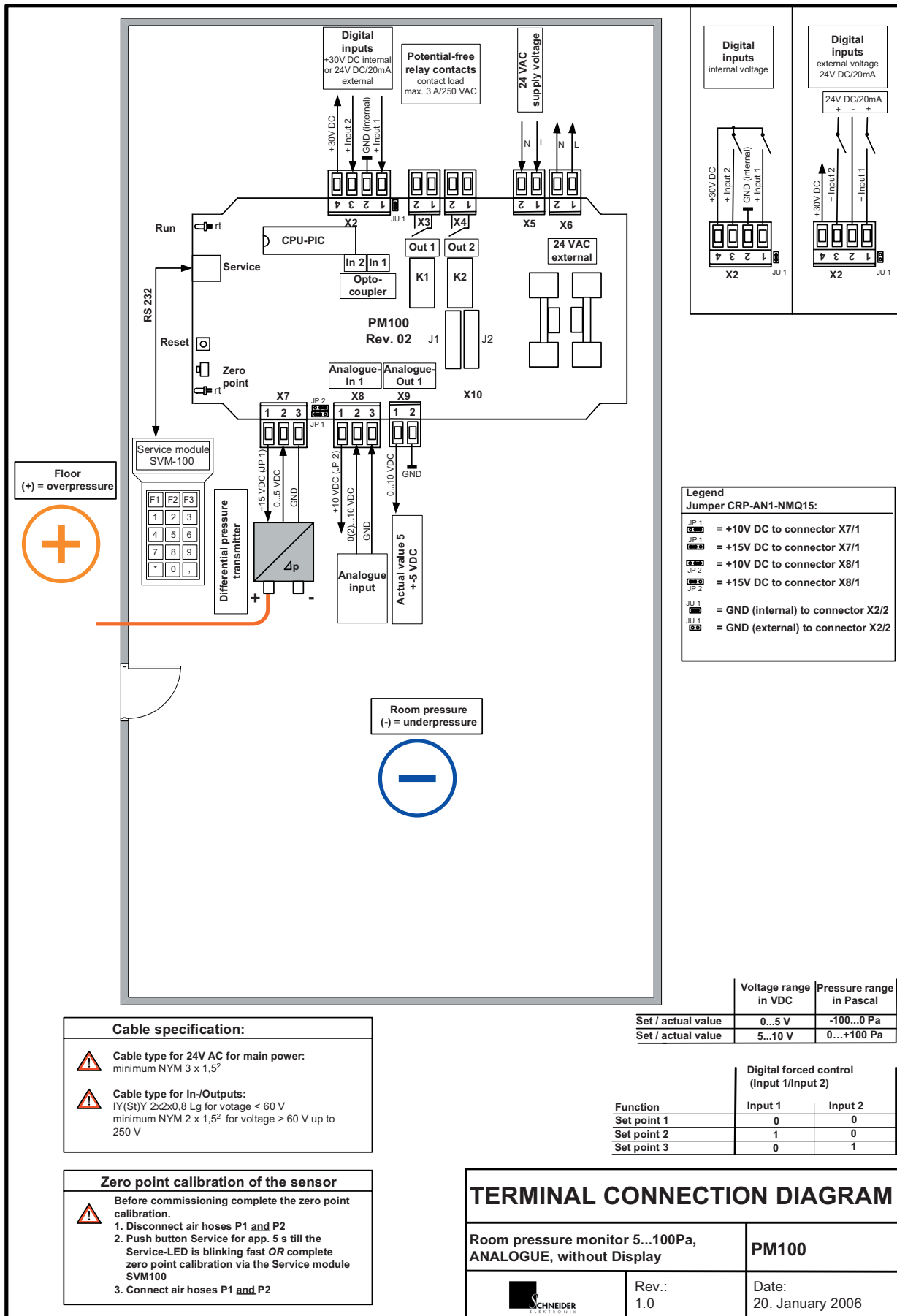**Ordering example: External display**
External additional display with numeric room pressure display (3½ digit) in pascal and status display with alarm acknowledgement.

Make: **SCHNEIDER**

Type: **DIS220**

Terminal diagram: room pressure monitor with analog input PM100-A-1-x-2

Digital inputs
+30V DC internal or 24V DC/20mA external

Potential-free relay contacts
contact load max. 3 A/250 VAC

24 VAC supply voltage

Digital inputs
internal voltage

Digital inputs
external voltage 24V DC/20mA

24V DC/20mA

+30V DC | + Input 2 | GND (internal) | + Input 1

X2 | JU 1
X3 | X4 | X5 | X6

Run — rt
CPU-PIC
Service
In 2 | In 1
Opto-coupler
Out 1 | Out 2
K1 | K2
24 VAC external

RS 232

PM100 Rev. 02

Reset
Zero point
rt

J1 | J2

Analogue-In 1 | Analogue-Out 1

X7 | X8 | X9 | X10

Service module SVM-100

Floor (+) = overpressure

+

F1 F2 F3
1 2 3
4 5 6
7 8 9
* 0 #

Differential pressure transmitter

Δp

+ −

Analogue input

Actual value 5 +5 VDC

+15 VDC (JP 1) | 0...5 VDC | GND
+10 VDC (JP 2) | 0(2)...10 VDC | GND
0...10 VDC | GND

Room pressure (-) = underpressure

−

Legend
Jumper CRP-AN1-NMQ15:

JP 1	= +10V DC to connector X7/1
JP 1	= +15V DC to connector X7/1
JP 2	= +10V DC to connector X8/1
JP 2	= +15V DC to connector X8/1
JU 1	= GND (internal) to connector X2/2
JU 1	= GND (external) to connector X2/2

Cable specification:

⚠ **Cable type for 24V AC for main power:**
minimum NYM 3 x 1,5²

⚠ **Cable type for In-/Outputs:**
IY(St)Y 2x2x0,8 Lg for votage < 60 V
minimum NYM 2 x 1,5² for voltage > 60 V up to 250 V

	Voltage range in VDC	Pressure range in Pascal
Set / actual value	0...5 V	-100...0 Pa
Set / actual value	5...10 V	0...+100 Pa

	Digital forced control (Input 1/Input 2)	
Function	Input 1	Input 2
Set point 1	0	0
Set point 2	1	0
Set point 3	0	1

Zero point calibration of the sensor

⚠ **Before commissioning complete the zero point calibration.**
1. **Disconnect air hoses P1 and P2**
2. **Push button Service for app. 5 s till the Service-LED is blinking fast OR complete zero point calibration via the Service module SVM100**
3. **Connect air hoses P1 and P2**

TERMINAL CONNECTION DIAGRAM

Room pressure monitor 5...100Pa, ANALOGUE, without Display	**PM100**
SCHNEIDER ELEKTRONIK	Rev.: 1.0 / Date: 20. January 2006