

Assembly and Operating
Instructions

**Pressure Monitors,
Pressure Limiters**

Basic models	Additional functions
DWAM(V)...	...2xx ...3xx
SDBAM...	...5xx (Ex-i) ...2xx ...3xx
FD...	...3xx (Ex-i)

IMPORTANT SAFETY INFORMATION!
Read before installation and initial operation!

Characteristics

Application

Steam according to TRBS and hot water and installations according to DIN EN 12828.

Function

Pressure monitors
Pressure limiters (with internal or external locking)

Sensor

"Special design" by sensor with safety function (self-monitoring safety diaphragm).

Action direction

For maximum pressure monitoring.

Switch Housings

DWAM(V) Plug connection housing with device plug (as per DIN EN 175301)
 DWAM...-2
 DWAM...-3 Plug connection housing (300)
 DWAM...-5 Plug connection housing (500)
 FD...-3 Plug connection housing (500)

NOTE: Not all technically conceivable combinations of models are present in our list of stock. For this reason, we recommend that, before ordering, you first contact us so that we can assist you in selecting the models most suitable for your specific application.

E.U. Directives

Up to July 19, 2016	From July 20, 2016
RL 97/23/EC	2014/68/EU

Up to April 19, 2016	From April 20, 2016
RL 94/9/EC	2014/34/EU
2006/95/EC	2014/35/EU

E.U. Directives

**Certificates for DWAM, DWAMV,
SDBAM, FD**

E.C. type testing certificate
Module B as per RL 2014/68/EU
Test basis EN 12952-11 and EN12953-9
for DWAM, DWAMV and SDBAM
01 202 931-B-xx-0001

E.C. type testing certificate
Module B as per RL 2014/68/EU
Test basis EN 12952-11 and EN12953-9,
EN764-7 and EN13611ff for FD
01 202 931-B-xx-0002

E.C. type testing certificate
as per RL 2014/34/EU
Test basis EN 60079ff
IBExU12ATEX1040
IECEX IBE 14.0077

VdTÜV certificate as per EN 12952-11,
EN12953-9, and
VdTÜV Pressure 100/1

For DWAM, DWAMV: **TÜV.DW.xx-132**
For SDBAM: TÜV.SDB.xx-134

TÜV.com-certificate as per EN 12952-11,
EN12953-9
VdTÜV Pressure 100/1 for FD
ID:0000033127

NOTE: Pressure monitors are precision instruments,
set and adjusted at the factory. Therefore:
DO NOT open the device, and DO NOT
change the adjustment of the varnished
adjustment screws. The switching points
would change – readjustment would be
necessary.

RoHS Conformity for China

部件名称 Component Name	有害物质 Hazardous Substances					
	铅 (Pb) Lead (Pb)	汞 (Hg) Mercury (Hg)	镉 (Cd) Cadmium (Cd)	六价铬 (Cr6+) Chromium VI Compounds (Cr6+)	多溴联苯 (PBB) Polybrominated Biphenyls (PBB)	多溴二苯醚 (PBDE) Polybrominated Diphenyl Ethers (PBDE)
ELECTRIAL COMPONENTS 电气元件	○	○	X	○	○	○
FASTENERS AND SEALING PARTS 紧固件和密封件	X	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。

This table is prepared in accordance with the provisions of SJ/T 11364.

RoHS Conformity for China

O : 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

O : Indicates that said hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement of GB/T 26572.

X : 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

X : Indicates that said hazardous substance contained in all of the homogeneous materials for this part is above the limit requirement of GB/T 26572.

未列入表内的其他部件，皆不含任何超出限量要求的限制使用物质。

All other components not listed in the table do not contain restricted substances above the threshold level.

IMPORTANT SAFETY INFORMATION

Please read this before installation and commissioning!

Installation and Commissioning

- ▶ Pressure monitors may be installed only by personnel trained in this application area (electric/hydraulic/mechanical) in accordance with the installation instructions and local legal requirements.
- ▶ The devices must be installed (mechanical, pressure-side connection) only on electro-chemically matched materials; otherwise, there is a risk of damage to base metals through contact corrosion, which can result in leakage and loss of stability.
- ▶ Caution when touching the device – risk of burns. Device can reach a medium temperature of up to 60 °C. Risk of freezing when working with media up to -25 °C.
- ▶ Do not open wiring box or plug and do not remove terminal screws before the device is de-energized.

Safety Instructions

- ▶ Devices of the DWAM, DWAMV, and SBDAM are designed for use as pressure monitors and limiters for steam and hot water as well as for and for process engineering applications in which self-monitoring functionality is necessary in order to comply with safety requirements.
- ▶ FD16-326 and FD16-327 are designed for monitoring gas in liquid form. Devices are only allowed to be installed in combination with an ex-I certified insulation amplifier equipped for monitoring electrical supply loop for short-circuiting and cable break. Never directly supply FD with current!
- ▶ The device must be used only within the electric, hydraulic, and thermal limits specified in the data sheet.
- ▶ Inductive loads can cause contact burns or fuse the contacts. Preventive measures must be implemented by the customer, e.g., by using suitable RC elements.
- ▶ When using the version ZF 1979 (oil and grease-free), take care to avoid recontamination of surfaces that are in contact with the media, right through from opening the packaging to completed installation. Generally, no liability will be assumed for the oil and grease-free version.

-
- ▶ High-quality stainless-steel sensor parts coming in contact with media enable the devices to be used with a variety of media. However, a **chemical resistance test** MUST be carried out before selection.
 - ▶ Use with acids and other aggressive media, such as hydrofluoric acid, copper chloride, aqua regia, or hydrogen peroxide is not permitted.
 - ▶ Use in systems with unstable gases and liquids such as hydrogen cyanide, dissolved acetylene or NO_x is not permitted.
 - ▶ Devices must be protected from solar radiation and rain.
 - ▶ Pressure monitors are precision devices, which are calibrated in the factory. Never open the device and do not change the adjustment of the varnished calibration screws.
 - ▶ Protect the pressure monitor against excessive vibrations, e.g., by means of mechanical isolation or other vibration damping measures.
 - ▶ Heavily contaminated media can clog the sensor and cause errors and/or malfunction. If the equipment is being used for this purpose, suitable chemical seals must be connected.
 - ▶ Pressure monitors and chemical seals form a functional unit and must not be disconnected from each other in the field.

Safety Instructions

- ▶ Before disassembly (removing the pressure monitors from the system), the device must be disconnected from the power supply and the system must be emptied. Observe the Accident Prevention Regulations.
- ▶ Never use the pressure monitors as a climbing aid!
- ▶ Honeywell GmbH accepts no liability for non-compliance.

PLT Protective Equipment

- ▶ If the device is installed in a Functional Safety-related circuit according to IEC 61511, the relevant data of the SIL certificate must be observed.

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1. Basic Equipment of Pressure Monitors / Pressure Limiters

Chapter 1 describes the basic equipment and the installation of the pressure monitors (without any additional functions). Further chapters deal with versions and additional functions.

1.1 Technical Data (basic equipment)

The following applies to all switches:

All switching and reset points must be within the limits of the specified setting range given in the technical data sheet.

Switch

Single-pole changeover (DWAM, DWAMV, SDBAM)

Switching capacity

8 (5) A, 250 V AC

Single-pole changeover (DWAMxx-57, FDxxx). Electrical data and switching values: See Chapters 4ff.

Installation position

Vertical and horizontal

Max. ambient temperature

-25 to 70 °C.

Max. medium temperature

70 °C. Higher medium temperatures are possible if the above limiting values at the switching device are not exceeded by suitable measures (e.g., water pocket tube).

At ambient temperatures below 0 °C, ensure that no water condensation will occur in the sensor and in the switching device.

Switching differential

Values see data sheet.

Pressure connection

External thread G ½ A (pressure gauge connection) according to DIN 16288 and internal thread G ¼" according to ISO 228, Part 1.

1. Basic Equipment of Pressure Monitors / Pressure Limiters

Switching box

Sturdy housing made of seawater-resistant aluminum die casting with plug connection (200) or terminal connection (300, 500).

Degree of protection as per EN60529

IP 54 (housing 200)

IP 65 (housing 300, 500)

Materials

See data-sheet.

NOTE: All pressure switches in the DWAM, DWAMV, SDBAM and FD series are calibrated by the manufacturer for rising pressure. In accordance with regulations, they may only be used as maximum pressure monitors or (SDBAM) as maximum pressure limiters.

For switching with rising pressure, this means:

(Lower range limit)

The smallest switching point that can be set is higher than the start of the scale by the value of the switching differential. The DWAM or DWAMV then switches back to the start of the scale in case of falling pressure. The SDBAM cannot be enabled until the pressure has dropped back to the start of scale value.

(Upper range limit)

The highest switching pressure that can be set is the end point of the scale. The DWAM and DWAMV switch back once the pressure has fallen by the switching differential value. The SDBAM cannot be enabled until the pressure has fallen by the switching differential value.

1.2 Electrical Connection

Wiring diagram DWAM, DWAMV,
SDBAM

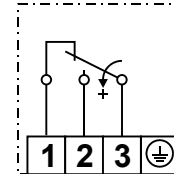


Fig. 1. Wiring diagram
DWAM, DWAMV, SDBAM

With rising pressure:

3–1 opens, 3–2 closes

In the case of pressure limiter SDBAM,
the following applies to rising pressure:

Only after pressure has fallen by the
switching differential is it possible to
unlock the device. After mechanical
unlocking, 3-2 opens, and 3-1 closes.

Wiring

CAUTION:
SWITCH OFF VOLTAGE!

Wiring is on the angled plug. The cable
outlet can be in any of 4 positions - which
are at 90° in relation to each other – or at
the connection terminals of the terminal
housing models ...-3xx and -5xx.

1. Basic Equipment of Pressure Monitors / Pressure Limiters

- ▶ Remove screw.
- ▶ Insert the screwdriver in the slot and press downwards.

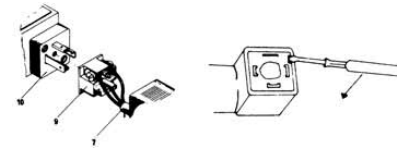


Fig. 2. Wiring

On devices with terminal connection housing (300), the terminal board is accessible after removing the terminal box lid.

1.3 Pressure Connection

Installation

Directly on the pipeline (pressure gauge connection G 1/2" or G 1/4" internal thread) or (on a flat surface) with 2 screws Ø 4 mm. Tighten the device only at the hexagon located closest to the pressure connection. Never tighten device at

housing or other area of sensor parts. Never use housing or plug as a lever arm.

External thread G 1/2", Internal thread G 1/4"

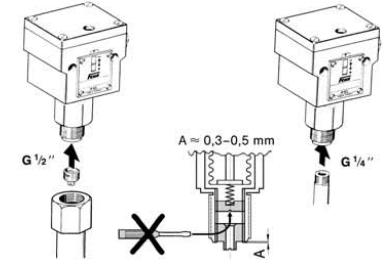


Fig. 3. Pressure switch

External thread G 1/2"

(Pressure gauge connection)

When using flat seals, turn in the centering screw (depth A approx. 0.3 – 0.5 mm).

Internal thread G 1/4"

In gas applications, internal thread is permissible only up to pressures of 4 bar. Use flat gasket ring for pressure > 4 bar.

1.4 Setting the Switching Pressure

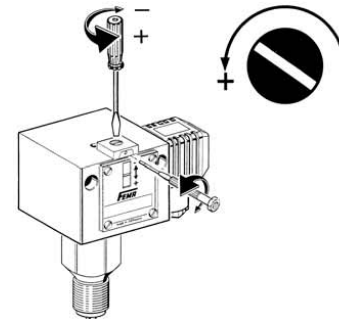


Fig. 4. Setting the switching pressure



**CAUTION:
SWITCH OFF VOLTAGE!**

The switching pressure is set using the setting spindle. Before setting, loosen the setscrew located above the scale by **approx. 2 turns** and tighten it again after setting.

The scale value corresponds to the switching point (for rising pressure). The reset point is lower by the value of the switching differential.

The scale is used for an approximate value; a pressure gauge is required for an accurate setting.

On terminal connection housings, the setting screw is accessible after removing the cover.

1.5 External Electrical Interlock in the Switchgear Cabinet (circuit examples)

A pressure monitor can also be used as a limiter if an electrical interlock is connected in series. For pressure limitation in steam and hot water boilers, the external interlock is permissible only if it is assured that the pressure monitor is of "special construction."

Maximum pressure limitation with external interlock

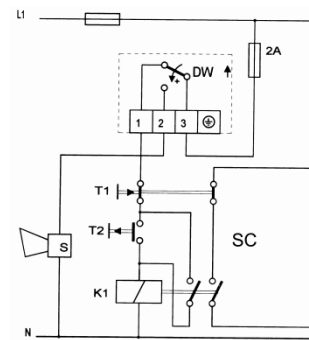


Fig. 5. Maximum pressure limitation

DW = pressure monitor
 T1 = STOP
 T2 = START
 S = signal (as required)
 K1 = relay with self-hold
 SC = safety circuit

When the interlock circuit shown above is used, the requirements according to DIN 57 116 / VDE 0116 are fulfilled if the electrical plant, such as contactors or relays, correspond to the external interlock circuit VDE 0660 or VDE 0435 respectively.

2. Pressure Monitors with Adjustable Switching Differential DWAMV...

2.1 Technical Data as for 1.1

2.2 Electrical Connection as for 1.2

2.3 Pressure Connection as for 1.3

2.4 Setting

One spindle is available for each setting: the switching pressure and the switching differential. Both spindles are arranged concentrically. The outer spindle with larger diameter adjusts the switching point. The switching differential and thus the reset-point is changed with the small screw located internally.

The action direction is indicated by the arrow.

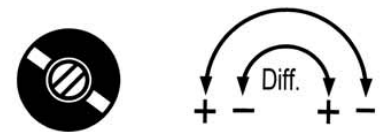


Fig. 6. Action direction



CAUTION:

When approaching the max. switching differential value, take care that the differential spindle not be turned so far as to hit the stop and possibly jam, as this could interfere with switching back. In the event that this nonetheless accidentally happens, loosen the screw by a half or full rotation.

Setting sequence

- Switching point (i.e., with rising pressure), with outer spindle, according to scale or pressure gauge
- Using the small, internal screw, adjust the switching differential and thus also the reset-point.

When the switching differential is changed, the upper switching point SP remains unchanged, while the lower switching point is shifted by the switching differential x_d .

2. Pressure Monitors with Adjustable Switching Differential DWAMV...

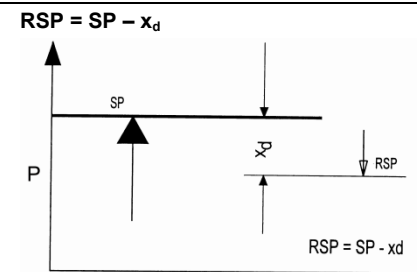


Fig. 7. Rising pressure $RSP = SP - x_d$

SP = switching point
RSP = Re-set point
 x_d = switching differential (hysteresis)
p = pressure

3. Maximum Pressure Limiters with Mechanical Interlock of Switching State (SDBAM...)

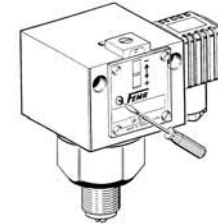


Fig. 8. Mechanical interlock

Instead of the microswitch with automatic reset, a “bi-stable” microswitch is installed in the limiters.

When the pressure reaches the value preset on the scale, the microswitch switches over and remains in this position. The catch can be released by pressing in the unlocking button (marked

on the scale side of the switching device by a red dot). The limiter cannot be unlocked until the pressure has decreased by a certain amount or, in case of interlocking at the lower switching point, is increased again.

3.1 Technical Data as for 1.1

3. Maximum Pressure Limiters with Mechanical Interlock of Switching State (SDBAM...)

3.2 Electrical Connection SDBAM...

Switching over and interlocking on rising temperature. Connection of control circuit to terminal 1 and 3.

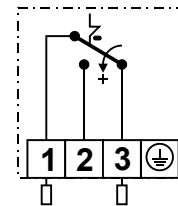


Fig. 9. Electrical Connection

3.3 Unlocking of maximum pressure limiters SDBAM...

By pressing in the button red on the scale side of the switching device (e. g., with screwdriver or ball-point pen).

Unlocking does not become effective until the pressure on the probe has dropped below the set switching pressure:

Type	pressure change for unlocking:
SDBAM 1	0.12 bar
SDBAM 2.5	0.15 bar
SDBAM 6	0.4 bar
SDBAM 625	0.6 bar
SDBAM 16	0.8 bar
SDBAM 32	3.0 bar

3.4 Setting as for 1.4

NOTE: In the case of maximum pressure limiters, the scale value corresponds to the upper switching point.

4. Pressure Monitors with Gold-Plated Contacts DWAM...

Gold-plated contacts are used exclusively in the low-voltage range in order to keep the transfer resistance at the contacts low.

4.1 Technical Data for Devices with Gold Contacts (no Ex devices) ...-213:

Switching capacity	max. 24 V DC
	max. 100 mA
	min. 5 V DC
	min. 2 mA

At higher voltages and currents, the gold layer on the contacts will be damaged. All other data correspond to the basic equipment.

4.2 Test Basis and Safety Information for Intrinsically Safe Circuits (Ex-i)

Test basis: EN60079-11

Ex-i intrinsic safety is based upon the principle that devices in systems equipped with an ATEX-certified switching amplifier require only minimal voltage and current. Sparks which might form when the microswitch's contact is opened are thus minimized, as a result of which the surrounding flammable atmosphere cannot be ignited.

FEMA Ex-i pressure monitors are equipped with gold contact microswitches (except for those devices featuring internal interlocking for the purpose of min. or max. limitation). A blue cable gland, the Ex-I manufacturer's plate, and the serial number identify those pressure switches suitable for use in intrinsically safe circuits.

Generally speaking, Ex-I pressure switches are suitable for use in zones 1

4. Pressure Monitors with Gold-Plated Contacts DWAM...

and 2 (gas) as well as 21 and 22 (dust). When equipped with a category "ia" switching amplifier, such devices can also be employed on the process-side in zone 20 (dust) and zone 0 (gas).

Devices not equipped with cable-break and short-circuiting monitoring:
DWAM, ending in -513 or -563.

Devices equipped with cable-break and short-circuiting monitoring:
DWAM, with suffixes ...-576, ...-577, as well as FD16-326 and FD16-327.

Next to the manufacturer's plate and the microswitch, these devices also have a built-in resistor-combination (10kOhm / 1.5kOhm) which – together with a suitable (ATEX-certified) switching amplifier – allows monitoring of cable-breaks or short-circuits.

Generally speaking, the type-tested pressure monitors with intrinsically safe

circuits (Ex-i) may be operated only in combination with suitable switching amplifiers. In any case, their electrical data must correspond with the electrical ratings of the pressure devices. Wiring of switching amplifier only according to its mounting and wiring instructions and valid standards and guidelines for intrinsic safe circuitry.

4.3 Pressure Monitors in Intrinsically Safe Control Circuits with Resistor Combination ...-513 and ...-563

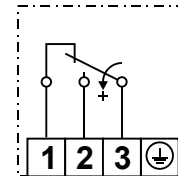


Fig. 10. Wiring diagram

Gold contacts SPDT. Switching differential not adjustable. Wiring diagram valid for maximum pressure monitoring. At rising pressure, contact 1–3 opens and 2–3 closes.

Installation only in combination with a suitable EC-type tested switching amplifier. Amplifier must be installed outside the Ex-zone. Wiring diagram of switching amplifier and valid installation

guidelines for Ex-I circuits must be observed.

Wiring parameters

U_i: 24 VDC I_i: 100mA
L_i: 100μH C_i: 1nF

Type of Ex-protection

⊕ II 1/2G Ex ia IIC T6 Ga/Gb

⊕ II 1/2D Ex ia IIIC T80°C Da/Db

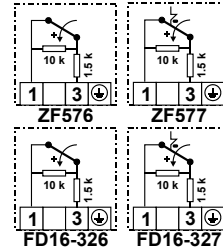
Ambient temperature: -25 °C... +60 °C.

Approvals

ATEX: IBExU12ATEX1040

IECEX: IECEX IBE 14.0077

4.4 Pressure Monitors and Limiters in Intrinsically Safe Control Circuits with Resistor Combination for Cable-Break and Short-Circuiting Monitoring



The pressure monitors and limiters correspond in all technical data to the aforementioned model series. In addition, a resistor-combination is included in the switching device which, together with a suitable Ex-proof switching amplifier, monitors the wires between the isolating amplifier and the pressure monitor for cable break and short circuit. In case of

cable break or short circuit, the system switches off towards the safe side. According to its approval, the switching amplifier must be installed outside of the Ex-zone.

Wiring parameters

U_i : 14 VDC R_i : 1.5 kOhm
 L_i : 100 μ H C_i : 1 nF

Type of Ex-protection

Gas: Ex II 1/2G Ex ia IIC T6 Ga/Gb
 Dust: Ex II 1/2D Ex ia IIIC T80°C Da/Db

Approvals

ATEX: IBExU12ATEX1040

IECEX: IECEX IBE 14.0077



CAUTION:

Never operate pressure monitors with resistor combinations without suitable switching amplifier. Device can overheat and burn due to overload of resistor combination.



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