

Operating instruction

FMA 200 C

***digital flow meter in a block
for the integration
into pressurisation systems***



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Important! It is imperative to read and observe the safety instructions prior to start up!

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Technical Data

Measuring range	0 .. 200 l/h
Display resolution	1 l/h
Max. measuring error (at 20 °C)	±3 % FS, ±1 digit
Max. temperature drift	±0.15 % FS/°C
Operating pressure (overpressure)	0 .. 1 bar
Supply voltage	36 .. 72 V= / 2.5 VA
Operating temperature	0 .. +50 °C
Storing temperature	-30 .. +80 °C
Admissible ambient humidity	0 .. 95 % rel. humidity, non-condensing
Signal output	dry contact
Max. switching voltage / current	100 V DC / 0.1 A DC
Frequency range	1000 Hz .. 2000 Hz
Resolution	1 Hz 0.2 l/h
Dimensions	
Flow meters (BxTxH)	64.2 x 106.2 x 110.2 mm
Flow meter block (BxTxH)	322 x 150 x 110.2 mm
Weight	
Flow meters	approx. 0.18 kg
Flow meter block including 5 FMA 200 C	approx. 1.80 kg

Ordering Data

Digital flow meter FMA 200 C

with display and key pad, signalling via dry contact
for installation in flow meter blocks

Order no. 064952.100

Accessories and spare parts

Flow meter block for 1-5 FMA 200 C **Order no. 064950.000**

Dummy plate for flow meter block **Order no. 064954.000**

19"-installation kit for one flow meter block
(for installation into 19" wall-mount cabinets and
front doors of RTS equipment) **Order no. 064955.000**

Installation kit for the first (top) flow meter block
(for replacement of flow indicators and expansions) **Order no. 065897.000**

Pneumatic installation kit for one FMA 200 C
(Output connector for new RTS equipment,
19" wall-mount cabinets and expansions) **Order no. 065898.000**

Common input air filter
(for installation into PE 10/7 hose) **Order no. 071011.000**

Micro air filter add-on kit for RTS 2802
(for installation of FMA 200 C in RTS 2802) **Order no. 071012.000**

Retrofit set for microfilter
(for installation of FMA 200 C in rotating frames) **Order no. 061687.000**

Dummy plate 19", 2.5 HE **Order no. 064498.000**

General Information

These operating instructions should make it easier for you to become acquainted with the product. They contain important information to ensure safe, appropriate and cost-effective use of the equipment.

The operating instructions endorse the directives of national regulations for the prevention of accidents and the protection of the environment.



These operating instructions shall be read and adopted by anyone assigned to work with/on the equipment, e. g. during operation to include setting-up, maintenance trouble-shooting.

In addition to the operating instructions and the mandatory regulations for the prevention of accidents, applicable in the operator's country and at the place of use, the recognized technical regulations for safe and professional operation shall also be observed.

Designated Use

The digital flow meter FMA 200 C is designed to measure the flow rate of dry and clean pressurized air in pressurized telecommunications cables. For this purpose it is mounted into a 19"-flow meter block, which can host up to 5 FMA 200 C. This block can be integrated into pressurisation systems or installed into distribution panels. An integrated interface allows the connection to the LANCIER online monitoring system.

Any non-compliant use excludes the manufacturer from liability for any damages. The operator carries the risk!

Safety Instructions



Important!

Read and observe safety instructions prior to initial operation!

- Keep the operating instructions ready to hand!



Accident prevention!

- The unit should only be operated in technically-sound condition, for its designated use, with safety and risk awareness in mind, taking into account the operating instructions. In particular, operational faults, which can compromise safety, should be rectified immediately!
- Only qualified employees work on and with the equipment
- Do not make any modifications to the equipment!



Risk of damage to property!

- Mounting, maintenance and repair work should only be performed by trained personnel!
- Only use original LANCIER replacement parts!



Accident prevention!

All circuit lines must be dead before the opening of the housing!

- Do not exceed the maximum permissible working pressure!
 - Use only the delivered high-pressure hoses.
 - Avoid kinks in hoses!
 - Assure properly fixed hoses!
 - Lead dry and cleaned air only through the instrument!
 - Equip pressurised air outlet hoses with air filter (LANCIER order no. 071011.000) to avoid pollution of the sensing element.
 - Observe maintenance instructions and intervals!
 - Do not use aggressive detergents for cleaning. Use lint-free cloths.
-

Function

The digital flow meter FMA 200 C is designed to measure the flow rate of dry and clean pressurized air. For this purpose it is mounted into pressurisation systems and can be connected to the LANCIER online monitoring system. The required addressing is effected by jumpers on the flow meter block's circuit board

The flow rate is displayed on a 3-digit LC display with a resolution of 1 l/h.

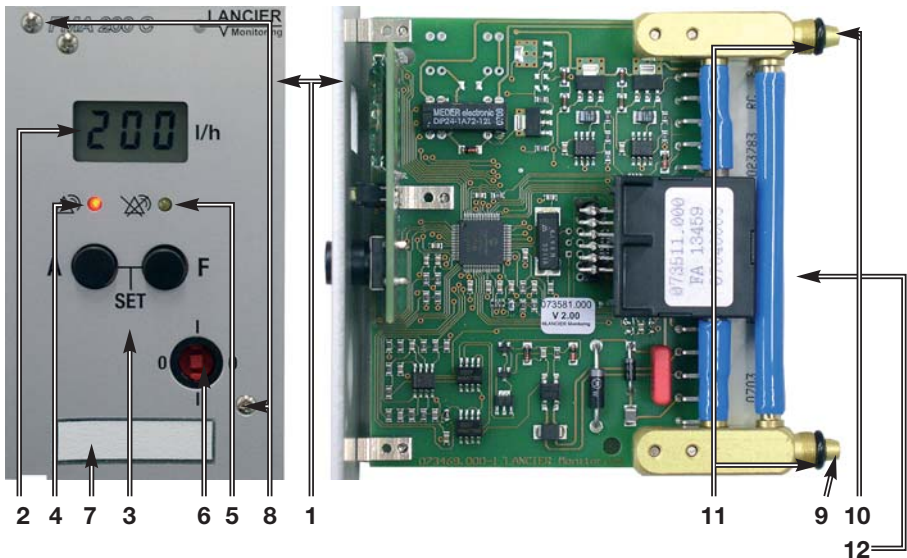
If a programmable alarm limit is exceeded, a red LED will begin to glow and a dry contact switches (e. g. to trigger an external LED panel).

If mounted into a flow meter block (**13**) the common signal contacts of several FMA 200 C flow meters are connected in parallel on the internal bus of the flow meter block (**13**). Thus a common alarm is signalled when one of the instruments exceeds the alarm limit. This alarm can be acknowledged to clear the line. The actual alarm condition is indicated by a yellow LED of the respective instrument, thus reminding of the fault elimination.

Product description

Flow meter FMA 200 C

- 1 **Addressable digital flow meter FMA 200 C**
- 2 **digital LC display, 3 digits**
shows the actual measured flow value permanently in l/h,
flashes when measuring range of 200 l/h is exceeded.
- 3 **Keypad**
- 4 **red LED - alarm**
- 5 **yellow LED - acknowledged alarm**
- 6 **Shut-off valve**
- 7 **Label**
- 8 **Fixing screws**
- 9 **Air inlet**
- 10 **Air outlet**
- 11 **O-ring**
- 12 **Wrap connection (hidden)**



Flow meter block

13 Flow meter block can host up to 5 digital flow meters type FMA 200 C

1 Digital flow meter type FMA 200

6 Shut-off valve of airflow to connected cable

14 Pressurised air input equipped with blind plug (delivery status)

15 Filter housing with micro filter

16 Pressurised air outlets to cables equipped with blind plug (delivery status)

17 Frame connector for electrical connection

18 Jumper for addressing in the monitoring system

19 19"-installation kit (option)

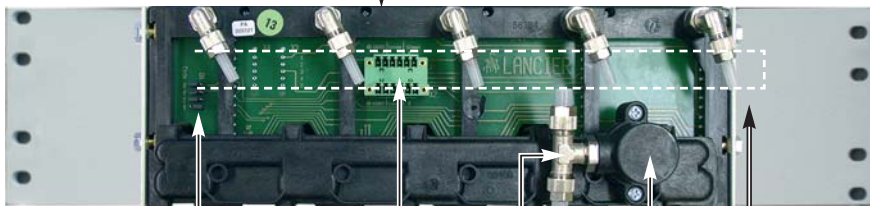


13

1

6

rear view



19

18

17

14

15

16

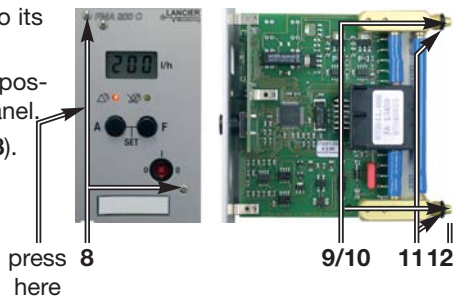
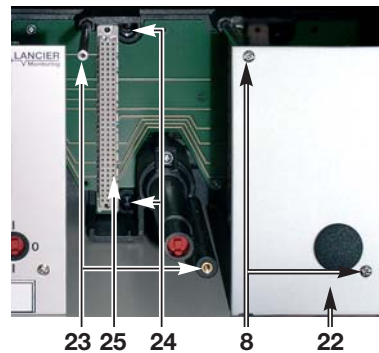


Mounting

Install FMA 200 C into flow meter block

unless delivered already installed.

- Remove dummy plate (22), if present, by unscrewing both screws (8).
- Check proper fitting of o-rings (11) at air inlet and outlet.
- Grease o-rings (11) with parafine jelly
- **Do not use other lubricants!**
- Push FMA straight along the dowel pins (23) inside the block.
 - both air in- and outlets (9, 10) must fit into their connection spout (24),
 - the wrap connection (12) must fit to its socket (25).
- Push FMA until the dead stop by imposing pressure to the left half of the panel.
- Fasten FMA by fixing both screws (8).



Dismantle flow meter

e.g. for maintenance or repair works



Accident prevention!

All circuit lines must be dead before the opening of the housing!



Accident prevention!

**System must be depressurised before the opening of the housing!
Close shut-off valves of equipment and low meters!**

- Unscrew both screws (8).
- Leverage the FMA with a small screw driver at the mounting slits and pull it out carefully.
- Take care, that the o-rings (11) are pulled-out as well and do not stay inside the flow meter block (if necessary take them out of the connection spouts (24)).



Mounting to equipment with 19"-racks



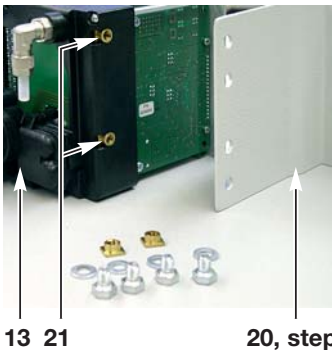
Risk of damage to property!
Use delivered parts only!



Accident prevention!
System must be depressurised before the opening of the housing!
Close shut-off valves of equipment and low meters!

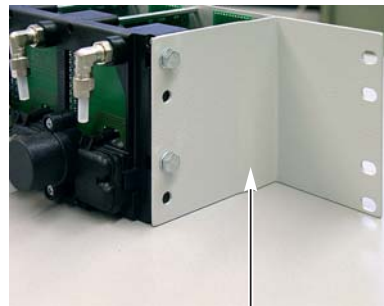
Complete flow meter block

- Use 19"-installation kit **(19)** (LANCIER order no. 064955.000) (contents: 4 square nuts, 4 washers, 4 screws M6x8, 2 angle brackets **(20)**).
- Push square nuts until the dead stop into the lateral slots **(21)** of the flow meter block **(13)**.
- Screw angle bracket **(20)** with the stepped side (arrow) to the flow meter block.



13 21

20, step



20

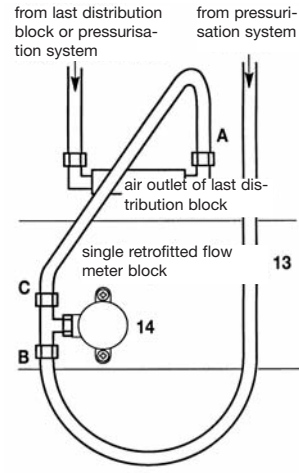
Install flow meter block

- Unscrew 19"-dummy plate if present and remove it.
- Place cage nut at necessary position.
- Fix flow meter block with screws to rack.

Pneumatical connection

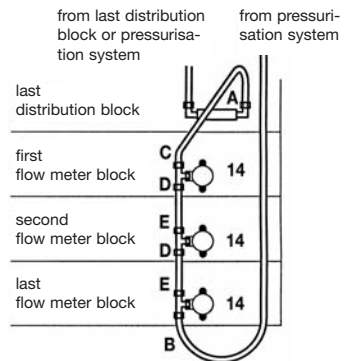
- in equipment with one flow meter block only

- Loosen and remove air input hose (A), of the last distribution block (if available, e. g. when retrofitting) coming from the pressurisation system.
- Cut new air input hose 8/6 to length (included in installation kit) and connect pressurised air outlet of the equipment to air inlet (14, B) of flow meter block (13).
- Connect the last distribution block (A) or the pressurised air outlet of the equipment with the second connector (C) of the pressurised air input (14) of the flow meter block (13) with an other hose 8/6 cut to length.



- in equipment with several flow meter blocks

- Loosen and remove air input hose (A), of the last distribution block (if available, e. g. when retrofitting) coming from the pressurisation system.
- Cut new air input hose 8/6 to length (included in installation kit) and connect pressurised air outlet of the equipment to air inlet (14, B) of the **last** flow meter block.
- Connect the last distribution block (A) or the pressurised air outlet of the equipment with the second connector (C) of the pressurised air input (14) of the **first** flow meter block with an other hose 8/6 cut to length.
- Connect all flow meter blocks lying in between with the short transparent hoses 8/6 of the installation kit at the pressurised air inputs (14) from (E) to (D).

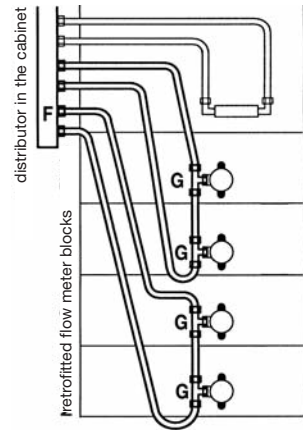


- retrofit in equipment with several flow meter blocks

- Loosen air input hose (B), which connects the last flow meter block to the equipment.
- Connect this hose to the pressurised air input (14, B) of the retrofitted flow meter block, replace hose by a longer one if necessary.
- Connect retrofitted flow meter block to the last old one with the short transparent hoses 8/6 of the installation kit at the pressurised air input (14) from (E) to (D).

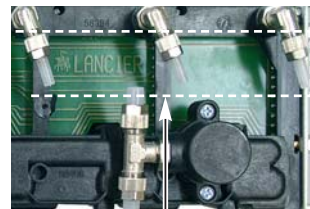
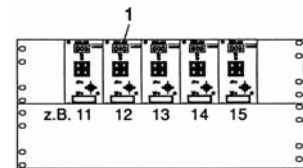
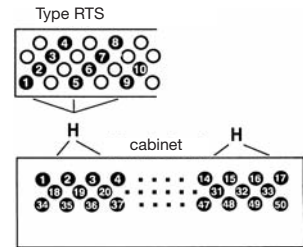
- in a cabinet

- Connect pressurised air hoses 8/6 according to the opposite drawing to distributor (F) and flow meter blocks(G).



Pressurised air outlet/distribution

- Screw the hose connectors 6/4 - 10/7 as air outlets (H) according to the opposite drawing into the equipment's cover.
- Connect the transparent air hoses 6/4 to the pressurised air outlet of the FMAs (16) and the appropriate equipment's outlet (H).
- Seal equipment's outlets (H) which are not yet in use with sealing plugs.



16

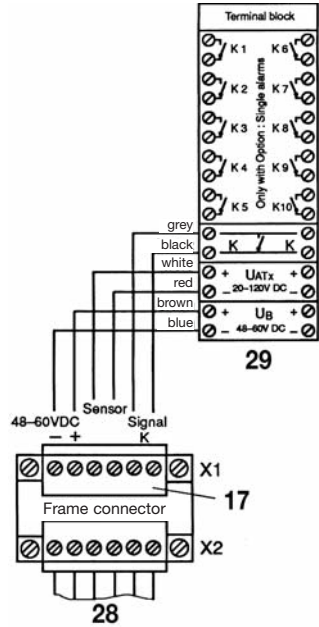
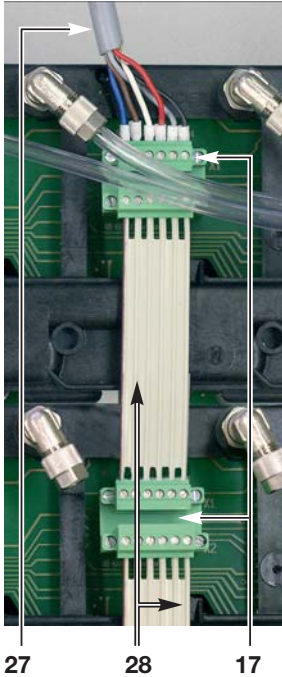


Risk of damage to property!

Equip pressurised air outlet hoses with air filter (LANCIER order no. 071011.000) to avoid pollution of the sensing element!

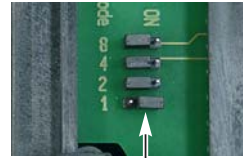
Electrical connection

- Plug delivered connection cable (27) into frame connector X1 (17) of the first flow meter block and connect its wires to the terminal strip (29) of the distribution block according to drawing stated below.
- Connect further flow meter blocks with the delivered ready to use connection cables (28) at the frame connectors (17) from X2 to X1.



Address coding for the monitoring system

If the flow meters shall be integrated in the LANCIER Monitoring System, they need a unique address, which is coded by the jumpers (18) at the back of the flow meter blocks.



18

Coding table

8	■○	■○	■○	■○	■○	■○	■○	■○	○■	○■
4	■○	■○	■○	■○	○■	○■	○■	○■	○■	○■
2	■○	■○	○■	○■	■○	■○	○■	○■	○■	○■
1	■○	○■	■○	○■	■○	○■	■○	○■	○■	○■
Flow meter block number	1	2	3	4	5	6	7	8	9	10
Flow meter address	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50

After intallation

- Open shut-off valve of the equipment.
- Open all shut-off valves of the flow meter blocks.
- Check all hose connections for tightness and seal if necessary.

Mounting to equipment with rotating frame



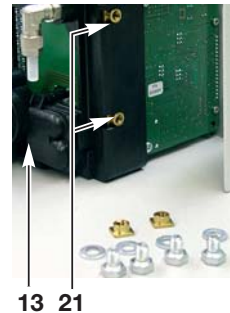
Risk of damage to property!
Use delivered parts only!



Accident prevention!
System must be depressurised before the opening of the housing!
Close shut-off valves of equipment and low meters!

Prepare flow meter block

- Use 19"-installation kit (19) (order no. 064955.000) (contents: 4 square nuts, 4 washers, 4 screws M6x8, 2 angle brackets (20)). Angle brackets are not required.
- Push square nuts until the dead stop into the lateral slots (21) of the flow meter block (13).



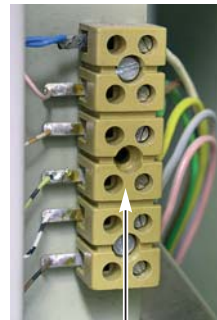
13 21

Dismantle old flow meter blocks (optional)

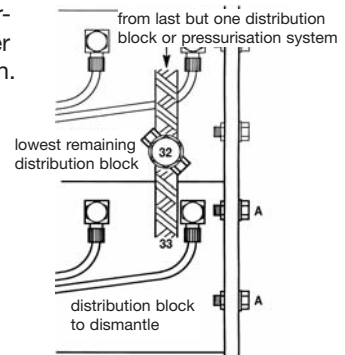
- When the equipment is modernised with new flow meter blocks type FMA 200 C dismantle all old flow meter blocks first.

If some of the old flow meter blocks shall stay in the equipment, all of them must be mounted consistently among each other. The new ones must be mounted consistently among the old ones!

- Disconnect the ribbon cables of the dismantled flow meter blocks off the terminal strip (36).
- Disconnect leaving pressurised air hoses from the dismantled flow meter blocks and mark them for reuse.
- Unscrew the hollow-core screw (32) of the lowest remaining flow meter block and remove the pressurised air hose (33) leading downwards. It is no longer required. Insert hollow-core screw (32) loosely again.
- Unscrew (A) and dismantle the no longer required flow meter blocks.

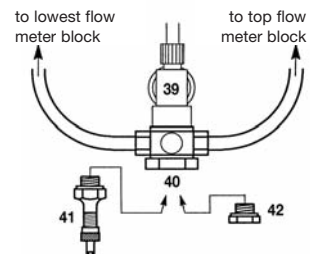
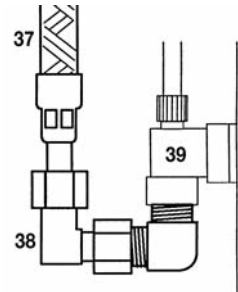


36



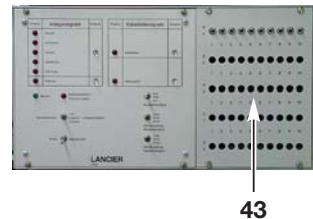
Dismantle top flow meter block

- Unscrew old air input hose (37) including screw connection (38) from shut-off valve (39).
- Screw T-connector (40) (included in installation kit) into the shut-off valve (39).
- Lead one of the new delivered air input hoses 8/6 from each of the both T-connector's (40) ends to the top and to the lowest flow meter block.
- If there had been a test valve (41) installed, it might be screwed into the hollow-core screw of the T-connector (40) including a gasket. In other case apply the delivered sealing screw (42) including a gasket.



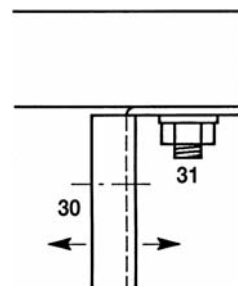
Dismatle appropriate supplement

- Dismantle supplement only when it is no longer connected to any flow meter block!
- Unscrew front cover plate (43) of supplements from signalling instrument
- Pull the relevant supplement out of the terminal.
- Screw on again front cover plate (43) of supplements to signalling instrument.



Install flow meter block

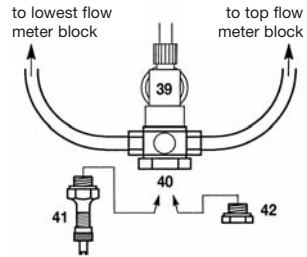
- The new flow meter blocks have the same dimensions like the old mechanical distribution blocks.
- When the equipment is **expanded** by new flow meter blocks FMA 200 C remove 19"-dummy plates if present .
- Adjust mounting width by displacing the mounting rail (30) in the rotating frame. for this purpose loosen and refix screws (31).
- Insert flow meter block including FMAs into the rotating frame and fix it with the screws of the installation kit.



Pneumatical connection

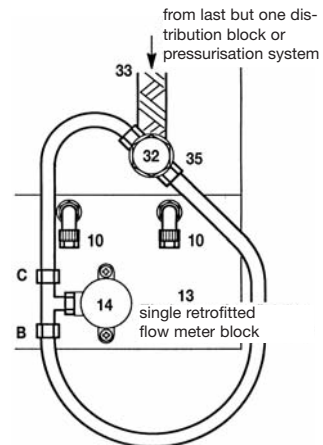
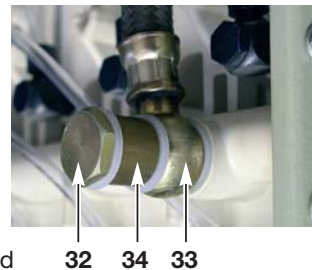
If there are NO more old distribution blocks:

- Connect one of the T-connector's (40) ends at the shut-off valve (39) with the pressurised air input (14, B) of the top new flow meter block (13), one at the pressurised air input (14, C) of the lowest flow meter block (13) by means of the new delivered air input hoses.
- Go on with chapter „For all versions“.



If there are ONE or MORE old distribution blocks:

- Unscrew the hollow-core screw (32) of the lowest remaining flow meter block and remove the pressurised air hose (33) leading downwards. It is no longer required.
- Replace spacer sleeve (34) (not present, when, pressurised air hose (33) has been removed previously) by ring sleeve with T-connector (35).
- Re-insert and tighten hollow-core screw (33) including the ring sleeve with T-connector (35) and the old pressurised air hose (33) leading upwards.
- Cut new air input hose 8/6 (included in the installation kit) to length and connect one end of the new ring sleeve with T-connector (35) and the pressurised air input (14, B) of the top new flow meter block (13) with it.
- Connect the pressurised air input (14, C) of the lowest new flow meter block (13) and the second end of the new ring sleeve with T-connector (35) with another hose 8/6 cut to length.



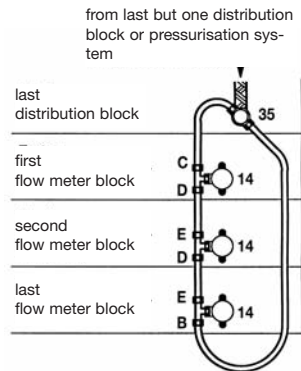
For all versions:

- Connect all flow meter blocks lying in between with the short transparent hoses 8/6 of the installation kit at the pressurised air inputs (14) from (E) to (D).
- Where applicable re-connect the old marked pressurised air hoses of the dismantled distribution blocks to the pressurised air outlets of the FMAs (10).

Worn, broken or porous hoses must be replaced!

Else

- Screw hose connectors 6/4 - 10/7 (included in the installation kit) as equipment air outlets into the distribution bar.
- Connect pressurised air outlets of the FMAs (10) and appropriate equipment air outlet with transparent pressurised air hose 6/4.
- Seal equipment's outlets which are not yet in use with sealing plugs.



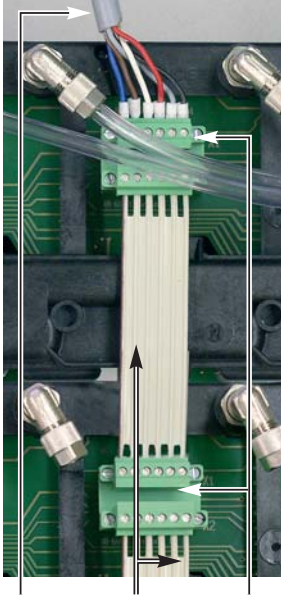
Risk of damage to property!

Equip pressurised air outlet hoses with air filter (LANCIER order no. 071011.000) to avoid pollution of the sensing element!

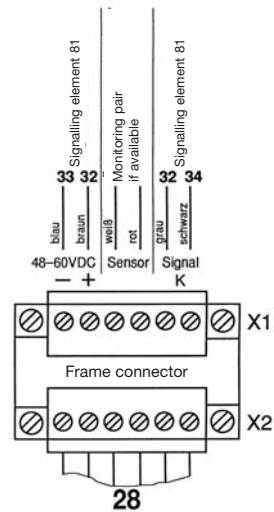
Electrical connection

- pressurisation systems with signalling instrument 81

- Plug delivered connection cable (27) into frame connector X1 (17) of the first flow meter block and connect its wires to the signalling instrument 81 and the monitoring pair according to drawing stated below.
- Connect further flow meter blocks with the delivered ready to use connection cables (28) at the frame connectors (17) from X2 to X1.



27 28 17



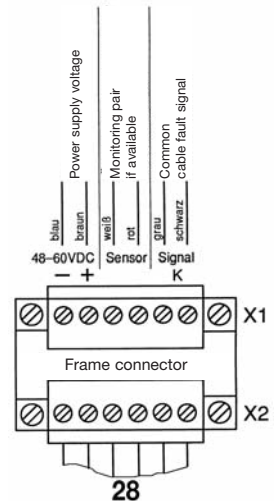
- other pressurisation systems

- Plug delivered connection cable (27) into frame connector X1 (17) of the first flow meter block and connect its wires to the signalling terminal strip of the respective equipment.



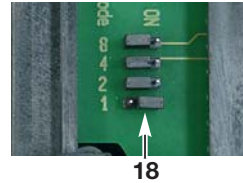
Risk of damage to property!
Power supply -48/60 V must not be connected before equipment fuse Q3!

- Connect further flow meter blocks with the delivered ready to use connection cables (28) at the frame connectors (17) from X2 to X1.



Address coding for the monitoring system

If the flow meters shall be integrated in the LANCIER Monitoring System, they need a unique address, which is coded by the jumpers (18) at the back of the flow meter blocks.



Coding table

8	■○	■○	■○	■○	■○	■○	■○	■○	○■	○■
4	■○	■○	■○	■○	○■	○■	○■	○■	○■	○■
2	■○	■○	○■	○■	■○	■○	○■	○■	○■	○■
1	■○	○■	■○	○■	■○	○■	■○	○■	○■	○■
Flow meter block number	1	2	3	4	5	6	7	8	9	10
Flow meter address	1-5	6-10	11-15	16-20	21-25	26-30	31-35	36-40	41-45	46-50

After installation

- Open shut-off valve of the equipment.
- Open all shut-off valves of the flow meter blocks.
- Check all hose connections for tightness and seal if necessary.

The LANCIER Tx-Bus

A maximum of 127 addressable transducers can be connected to one supervision pair but maximal 50 flow meters FMA 200 C owing to their increased current consumption.

The measured values of all sensors connected to the LANCIER monitoring system are transmitted in time intervals. Therefore all installed sensors must be coded before being installed.

Function Test

Each transducer has to be checked with the Lancier Testbox (Order no. 050833.000) for accurate function and coding. The necessary steps are described in the manual of the Testbox.



Important!

Check all transducers before use, in order to avoid later malfunction!

Startup

1. Set flow meter blocks into operation

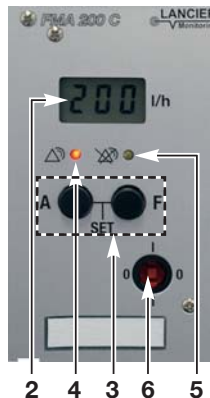
- Close all shut-off valves (6) of the flow meter blocks by turning the delivered key (44).
- Switch on supply voltage of the equipment.
 - The flow meter blocks are ready for operation
 - The actual air flow is displayed = 000

2. Set the alarm limit

- Press left key **A** of the keypad (3).
The actual programmed alarm limit is shown in the display (2)

The value can be raised only.

- Hold the key **A** down for at least 1 s and then press the key **F** additionally.
- The rate of change increases if the key **F** is held down.
- Stop pressing the key **F** before the designated alarm value is reached. Set value gradually by pressing the key **F** shortly.
- If the designated alarm value is overrun, it must be raised further on. After reaching the maximum value of 200 l/h the display starts over at 0 l/h.
- The actual value is shown in the display (2)
- The alarm limit should be at least 5 l/h higher than the actual flow rate.



3. Functional test of cable fault signal „K“

- Each flow meter block must be tested individually.
- Set low alarm limit, e.g. 020.
- Open shut-off valve (6) of the tested flow meter.
 - The alarm limit is exceeded.
 - The red LED „alarm“ (4) illuminates.
 - The cable fault signal „K“ is activated.
- Close shut-off valve again.
- Check next FMA.



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Operation

Fill cable

1. Set the alarm limit

- see page 22

2. Fill cable

- Open shut-off valve (6) of flow meter.
- *The actual flow is displayed*

a) The measured values are in normal condition below alarm limit

- *Red LED (4) and yellow LED (5) are dark*
- *Display (2) shows actual flow*

b) Alarm value is exceeded

- *Red LED (4) glows*
- *Alarm contact „K“ is activated*
- Press key **A** of the keypad (3) to read the actual flow value in the display (2)
- Press key **F** of the keypad (3) to acknowledge the alarm.

c) Alarm value is exceeded and alarm is acknowledged

- *Red LED (4) glows*
- *Yellow LED (5) glows*
- *Alarm contact „K“ is deactivated*

d) The measured values exceed the measuring range of 200 l/h

- *Red LED (4) glows*
- *Alarm contact „K“ is activated*
- *Display (2) flashes „200“*

e) The measured values are sunk to normal condition, at least 4 l/h below alarm limit

- *Red LED (4) and yellow LED (5) are dark*
 - *Display (2) shows actual flow*
 - *Alarm contact „K“ is deactivated*
-

Maintenance

Every 1200 operating hours, if the flow meter blocks are fed by pressurisation equipments with integrated micro filter maintenance is necessary only every 4000 hours.



Important!

Mounting, maintenance and repair work should only be performed by trained personnel!

Exchange filter element of flow meter block

1. Block air flow

- Close shut-off valves (6) of all flow meter blocks FMA 200 C.
- Close shut-off valve (39) of pressurisation equipment.

2. Open Filter housing

- Open screws (45) of filter cap (46) with a crosstip screwdriver.
- Draw off filter cap (46).

3. Exchange filter element (47)

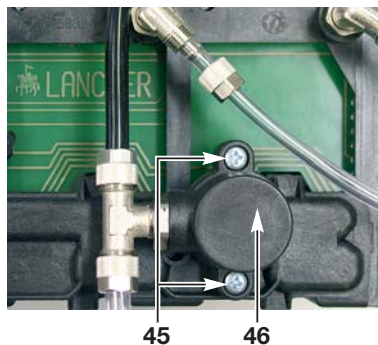
- Take out filterelement (47), sealing rings (48) and O-ring (49).
- Replace filterelement (47) (order no. 058722.000).
- Clean sealing rings (48) and O-ring (49) and check for damages, replace if necessary.
- Clean filter cap dust-free.

4. Assemble filter housing

- Lay O-ring (49), one sealing ring (48) and filtermelement (47) into the filter cap.
- Lay second sealing ring (48) into the filter retainer of the flow meter block.
- Place filter cap (46) and screw it on.

5. Restore operating status

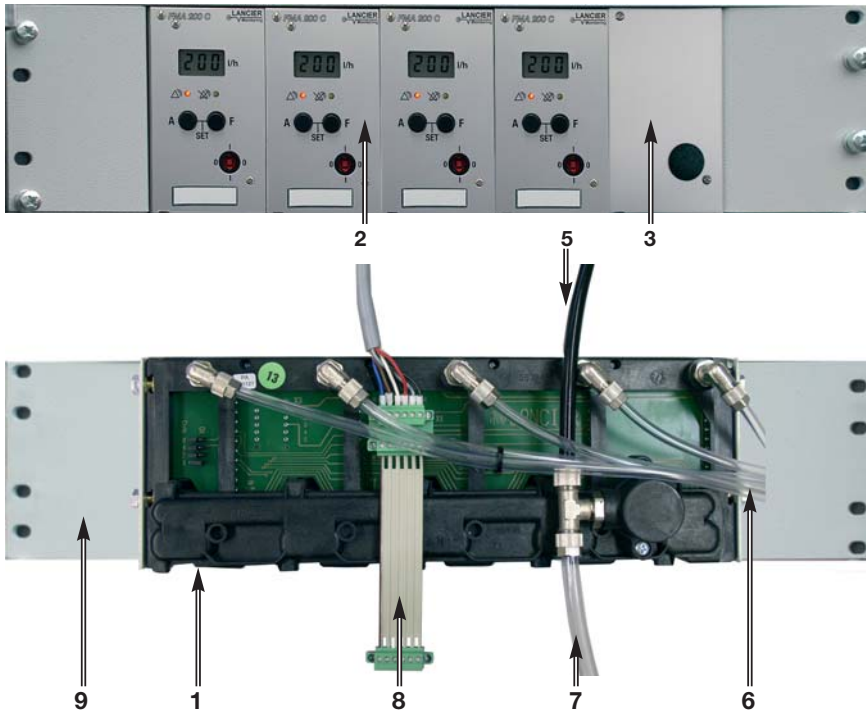
- Open shut-off valve (39) of pressurisation system.
- Open shut-off valves (6) of all flow meters FMA 200 C.



Spare parts

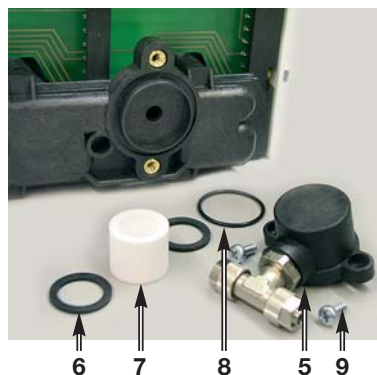
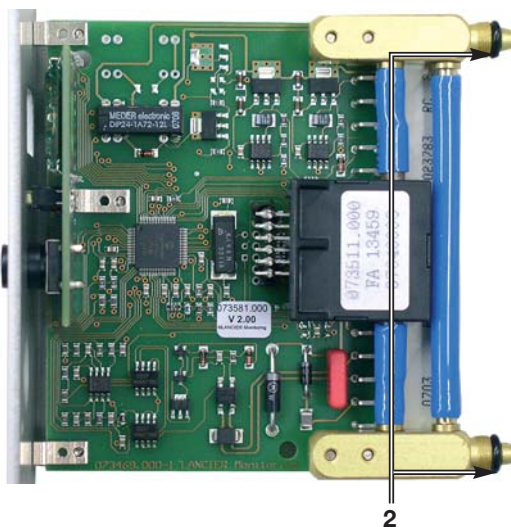
Flow meter block

Pos	Name (position number)	Order no.
1	Flow meter block for 5 FMA 200 C (13)	064950.000
2	Flow meter FMA 200 C (1)	064952.100
3	Dummy plate for flow meter block (22)	064954.000
4	Screw set for flow meter block mounting (without illustration)	062983.000
5	Hose 8/6, black, 2.0 m long (50)	018499.000
6	Hose 6/4, transparent, 2.2 m long (51)	015916.000
7	Hose 8/6, transparent, 8.5 cm long (52)	022902.000
8	Ready to use connection flat cable, 6-pin (28)	062986.000
9	19"-installation kit for flow meter block (19)	064955.000



Flow meter

Pos	Name (position number)	Order no.
1	Countersunk screw M2.5x6 (8)	052335.000
2	O-ring (11)	058579.000
3	Label (7), sheet of 120 pieces	062365.000
4	shut-off valve key (44)	069477.000
5	Filter cap (46)	058409.000
6	Sealing ring (48)	058766.000
7	Filterelement (47)	058772.000
8	O-ring (49)	065013.000
9	Rounded head screw (45) M4x10 for filter cap	007074.000



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EC Declaration of Conformity

in accordance with EC directives 98/37/EC

We declare under our sole responsibility that the product

Make: LANCIER Monitoring
Type: FMA 200 C

to which this declaration refers, meets the relevant health and safety requirements of the EC directive 98/37/EC, as well as the requirements of other relevant EC directives.

73/23/EEC Low voltage directive
89/336/EEC Electromagnetic compatibility

For proper implementation of the health and safety requirements named in the EC directives the following standard(s) and/or technical specification(s) have been consulted:

EN 61000-6-3/4 Emitted interference
EN 61000-6-1/2 Interference resistance (fault-free operation)

Münster, 4 April 2007


Research and Development


Managing Director