Technical
specification

MAS 711 Monitoring system

FLYGT
a xylem brand

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Technical specification MAS 711

General information

Flygt MAS 711 is a pump monitoring system suitable for large Flygt pump models, that is pumps equipped with a separate cable for monitoring.

The primary task is to protect the pump in case of failure and to prevent faults from occurring. In case of alarm, MAS has capabilities to present useful information and to communicate it to a higher level system i.e. a central computer.

MAS consists of two main parts to be mounted in an electrical cabinet: a Base unit and an Operator panel. There is also an optional Power analyzer. A Pump memory is mounted as standard in all large pumps.

For redundancy reasons, a MAS Base unit serves only one pump. Thus, each pump can be run in automatic or manual mode with adequate protection, independently of the other pumps in the station.

MAS features the following:

- Embedded web pages for presentation of data, alarms and setup, accessible via PC and MS Internet Explorer (v.6.0) or Mozilla (v.1.6).
- Pump memory – a unit mounted in the pump.
- Connection of all optional sensors of the Flygt large pump range (10 inputs).
- Current measurement input.
- Optional Power analyzer.
- Running time and number of starts counters.
- Service request, based on running time, number of starts or fix date.
- Communication port for connection to LAN, PC or the Internet (enables access to embedded web pages).
- RS-485/Modbus communication port for connection to Flygt FMC-controller or standard PLC.
- RS-232 com port for modem connection (enables access to embedded web pages).
- Alarm distribution by email.

The Base unit is the heart of the system and contains a powerful processor, a 2 Mbyte memory for logging of measurements, communications ports and terminals for sensor connections.

Installation and handling can be done by using the Operator panel with its keypad and menu system. However, the so-called Web tool constitutes a superior installation and interaction possibility. This is a feature enabled by the implementation of a web server in the Base unit. By using a PC with a web browser, the user can benefit from the graphics and interaction possibilities a computer offers. The Web tool can be accessed point-to-point with a PC, over Ethernet (local network or the Internet) or a telephone modem.

The Operator panel is used for local presentation of alarms and quick handling. The keypad and the menu system are designed for intuitiveness. A special feature is a navigation code system that refers each menu window to the user manual.

The Pump memory is intended to support the user at installation and maintenance.

It contains:

- Data plate information (i.e. serial number, electrical ratings) – thus accessible via the Operator panel or the Web tool.
- The customer's selection of installed pump sensors, standard settings of trip limits and other monitoring parameters. This information is uploaded at first installation.
- Statistical data such as accumulated running time, number of starts, histogram data of temperature and vibration.

For more comprehensive monitoring of the pump and the electrical supply grid, an optional Power analyzer can be added to the system. This instrument is used to acquire and transmit measured data of electrical quantities (see below).

MAS 711 – available sensors and optional channels

- Thermal switches (3 in series) or thermistors for stator temperature monitoring,
- Pt100 sensor for temperature measurement in the stator windings (3 sensors),
- Pt100 sensor for main bearing temperature,
- Pt100 sensor for support bearing temperature,
- Leakage sensor in the stator housing,
- Leakage sensor in the junction box,
- Leakage sensor in the oil housing or inspection chamber,
- Vibration sensor (or optional 4-20 mA sensor).

Additional channels available with a Power analyzer:

- Pump current, system
- Pump current, ph 1
- Pump current, ph 2
- Pump current, ph 3
- Current unbalance
- Voltage, system
- Voltage, L1
- Voltage, L2
- Voltage, L3
- Voltage unbalance
- Power, system
- Power factor
- Energy consumption

Standard monitoring alternative, large pumps (with 12- lead SubCab sensor cable)

Pumps equipped with a 12-lead SubCab will have the following monitoring components mounted as standard:

- Thermal switches for stator temperature monitoring (3 in series) or PTC-thermistors
- Leakage sensor in the stator housing
- Leakage sensor in the junction box
- Analog temperature sensor (Pt100) for main bearing temperature monitoring
- Analog temperature sensor (Pt100) for stator winding temperature in one phase
- Pump memory

This standard embraces large pump models:

- 3231
- 3306 up to 3800
- 7061 - 7121

Optional monitoring, large pumps

Additional monitoring functions require the use of a 24-lead SubCab sensor cable. The following options are available with MAS:

- Vibration sensor VIS 10,
- Analog temperature sensor (Pt100) for stator winding temperature in phases 2 and 3,
- Leakage sensor in the oil housing (CLS),
- Analog temperature sensor (Pt100) for support bearing temperature monitoring

MAS with midrange series pumps

Two alternatives, requiring the use of 12 lead Subcab cable, are available as standard. The two alternatives differ only in the selection of EITHER vibration sensor (VIS10) OR leakage sensor in the junction box.

- Thermal switches for stator temperature monitoring (3 in series) or PTC-thermistors,
- Leakage sensor in the inspection chamber,
- Analog temperature sensor (Pt100) for main bearing temperature monitoring,
- Analog temperature sensor (Pt100) for stator temperature monitoring in one phase,
- Pump memory (containing data plate and sensor configuration),
- EITHER vibration sensor (VIS10) OR leakage sensor in the junction box.

  Note! VIS10 is not available with 3153.

The following additional monitoring functions require the use of a 25-lead sensor cable:

- Vibration sensor (VIS10) AND leakage sensor in the junction box at the same time,
- Analog temperature sensor (Pt100) for stator temperature monitoring in phases 2 and 3,
- Analog temperature sensor (Pt100) for support bearing temperature.

The following additional monitoring functions require the use of a 24-lead sensor cable (not available with 3153):

- Vibration sensor VIS 10,
- Analog temperature sensor (Pt100) for stator wind-ing temperature in phases 2 and 3,
- Analog temperature sensor (Pt100) for support bearing temperature monitoring.

Recommendation to measure pump current

In order not to miss out on important functionality, it is recommended that pump current is measured with either of two alternatives at hand:

- Connection of a current transformer in one phase (1A secondary) to designated input terminals (11-12)
- Use of an optional Power analyzer to be connected to the Base unit input "Ext 2" (RS-485/Modbus)

Current measurement is often valuable in itself. Furthermore it puts in effect recording of running time, number of starts and listing of starts and stops. It is also a prerequisite for correct recording of vibration.

Wiring of Base unit. Large pumps

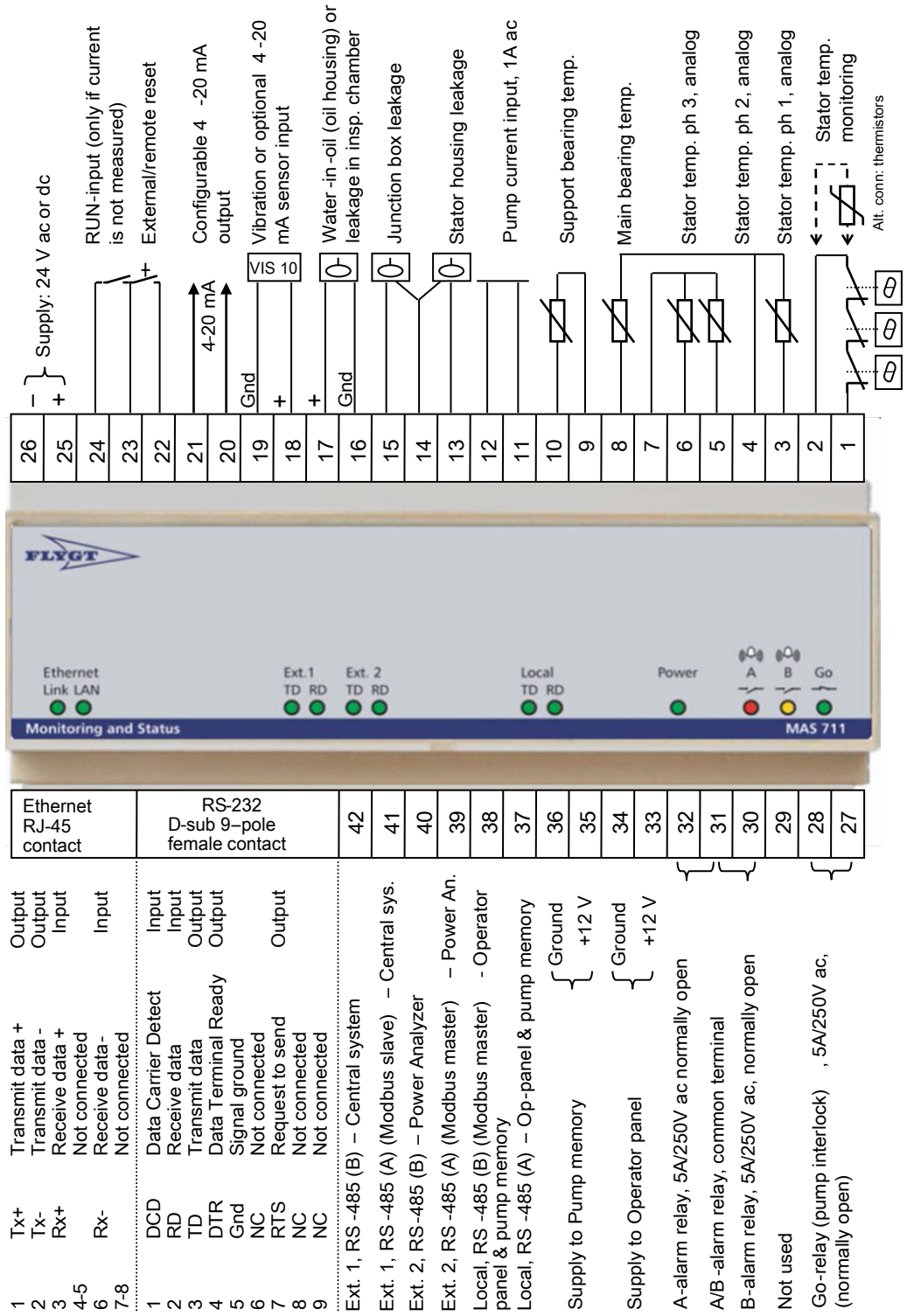

Figure 1

Wiring of Operator panel

Figure 2: Backside of Operator panel with four detachable terminals for wiring.

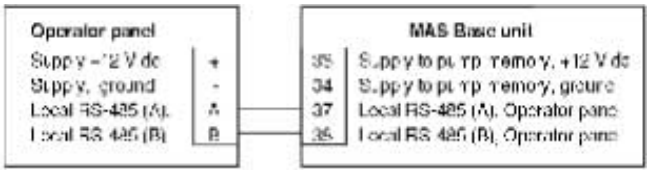

Figure 3

Wiring of Pump memory

Figure 4

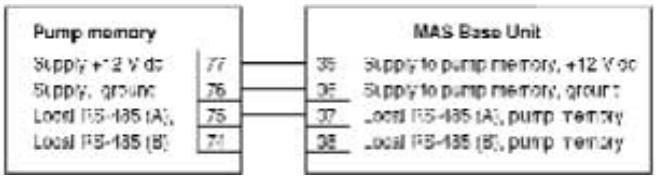

Figure 5

Wiring of base unit, midrange pumps

There are minor differences between midrange pumps (3153 – 3301) and large pumps with regard to leakage and vibration sensor connections, see below. The rest of the connections are done the same way as for large pumps, see previous section.

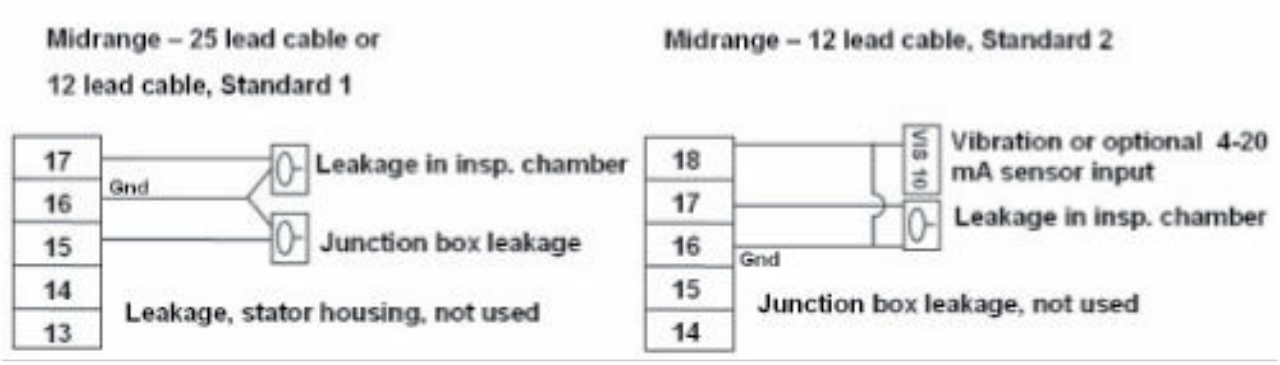

Figure 6

Dimensional drawings and mounting

Mount the Base unit on a 35 mm symmetrical DIN-rail.

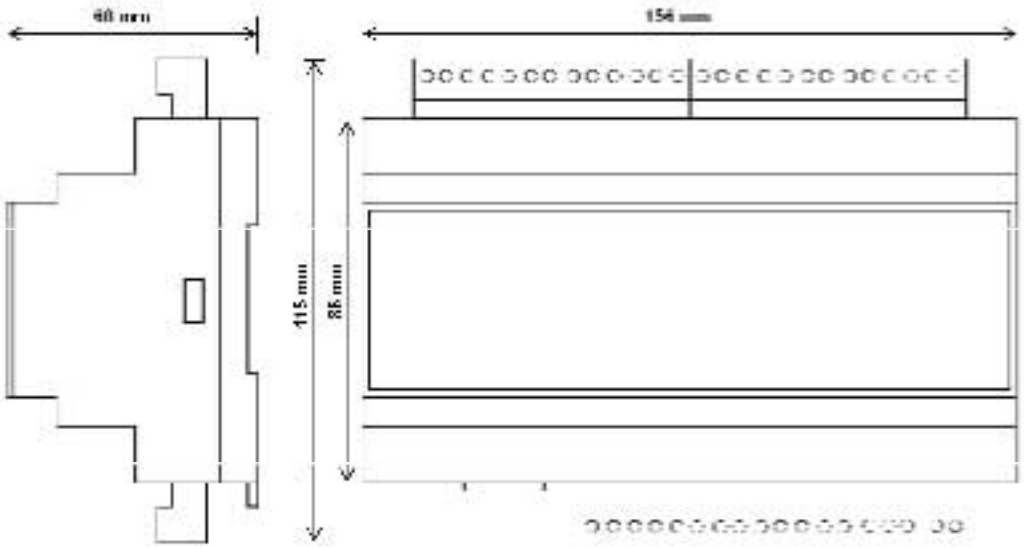

Figure 7

Mount the Operator panel either in a cabinet door or panel front. An alternative is to attach it on a 35 mm symmetrical DIN-rail.

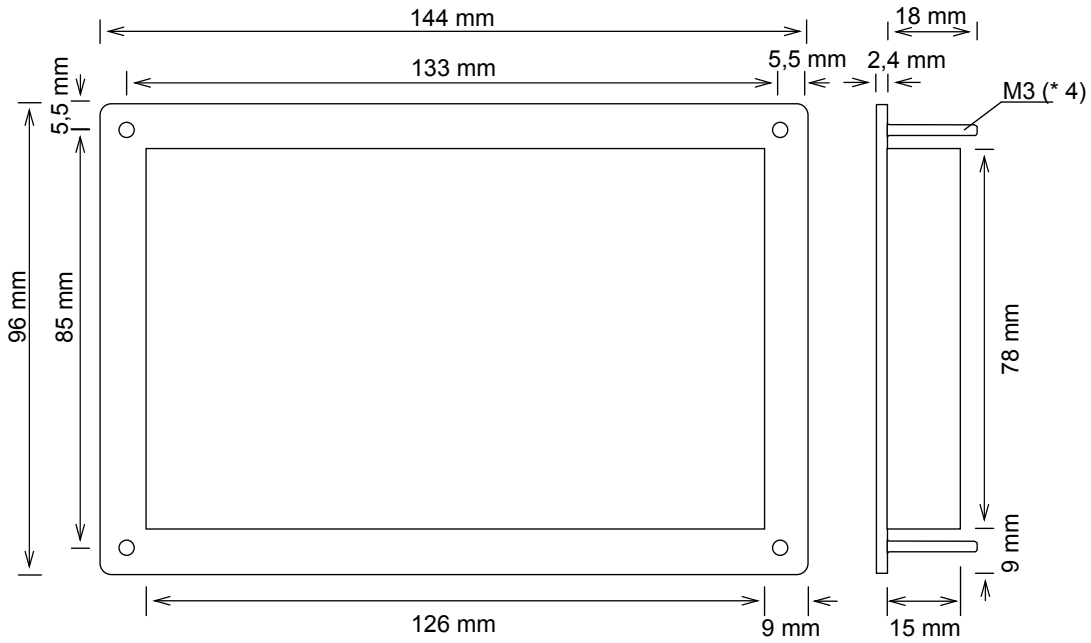

Figure 8

Note! The maximum thickness of a door or panel skin is 3 mm.

Technical data, Base unit

Power supply	24 V ac/dc +/-10%, (45-65 Hz)
Supply dropout	50 ms without function disruption
Power consumption	max 10 VA
Ambient temperature	-20°C to +60°C (-4°F to +140°F)
Humidity (non condensing)	RH 85%
Ingress protection	IP20
Outer dimensions, mm (in)	(WxHxD) 156x115x60, (6.14x4.5x2.4)
Approvals	CE, CSA/US

Inputs

I/O protection	All I/O:s are short circuit protected
Thermal switch/PTC-thermistor	Short circuit warning (thermistor)
Pt100 inputs (5)	Inaccuracy: +/-0.5+0.01T (Temp in °C)
Short circuit and interruption warning	
Leakage sensor inputs (3)	12 V dc, current sensing
Values of operation:	
I < 3 mA	Interruption
3 < I < 22 mA	OK
22 < I < 55 mA	Leakage
I > 55 mA	Short circuit

4-20 mA configurable	Default: VIS 10 (vibration sensor)
18 – 24 V dc	
Inaccuracy: +/- 1,5%	
Current transformer input	for CT with1 A rated secondary output
Inaccuracy: +/-1,5%	
Reset input (external/remote reset)	Configurable for closing or opening contact
RUN-input (pump run indication)	Pump "on" input, used in case pump current is not measured
Configurable for closing or opening contact	

Outputs

Go relay (pump interlock)	5A/250 V ac, normally opened (NO)
A-alarm relay	5A/250 V ac, (NO), configurable active open or close
B-alarm relay	5A/250 V ac, (NO), configurable active open or close
Supply to Pump memory	12 V dc
Supply to Operator panel	12 V dc

Communication

Ext 1. - RS-485/Modbus	For communication with central system (Flygt FMC or PLC). MAS Base unit is slave.
Ext 2. – RS-485/Modbus	For communication with Power analyzer. MAS Base unit is master.
Local – RS-485/Modbus	For communication with Pump memory and Operator panel. MAS Base unit is master.
RS-232, D-sub 9-pole	Female contact, point-to-point protocol (for modem)
Ethernet - RJ45 contact	For direct PC-connection, local area network or the Internet.

Technical data, Operator panel

Power supply	12 V dc from Base unit
Ambient temperature	-20°C to +60°C (-4°F to +140°F)
Humidity (non condensing)	RH 85%
Ingress protection	Panel mounted from outside IP67 Backside IP20
Outer dimensions, mm (in)	(WxHxD) 144x96x22 (5.7x3.8x0.87)
Approvals	CE, CSA/US
Communication port	RS-485/Modbus to Base unit

Technical data, Pump memory

Power supply	12 V dc + (from Base unit)
Communication port	RS-485/Modbus (Two-wire to Base unit)
Operating temperature range	-20°C to +105°C (-4°F to +221°F)
IP-rating	27 (submersible)

Dimensions	Height 20mm (including terminals) Width 40mm Depth 40mm
Mounting	Large pumps: On terminal plate 685 86 00 with a 4mm screw. Midrange pumps: Part of connector unit 691 83 00.

Part numbers

MAS 711 Operator panel	
English, German, French, Spanish, Italian, Swedish, Polish, Romanian, Hungarian	40 501140
Chinese	40 501277
Russian	40 501471
MAS 711 Base unit	
English, German, French, Spanish, Italian	40 501141
Chinese	40 501278
Russian	40 501472
Swedish	40 501474
Polish, Romanian, Hungarian	40 501599
MAS 711 Pump supervision kit (Operator panel and Base unit)	
English, German, French, Spanish, Italian	40 501142
Chinese	40 501279
Russian	40 501473
Swedish	40 501475
Polish, Romanian, Hungarian	40 501600
Power Analyzer, PAN 312	40 501526

Pump memory ordered as sparepart:

Pump memory	84 00 90
Connector unit with pump memory (associated	691 83 00

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2) A leading global water technology company

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The original instruction is in English. All non-English instructions are translations of the original instruction.

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