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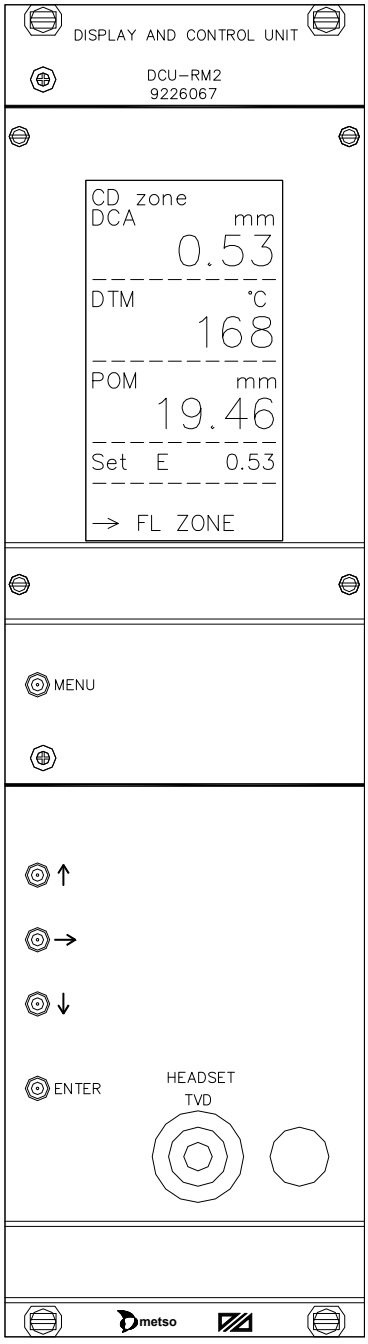
DCU – RM2



VAL0122830 / SKC9226067

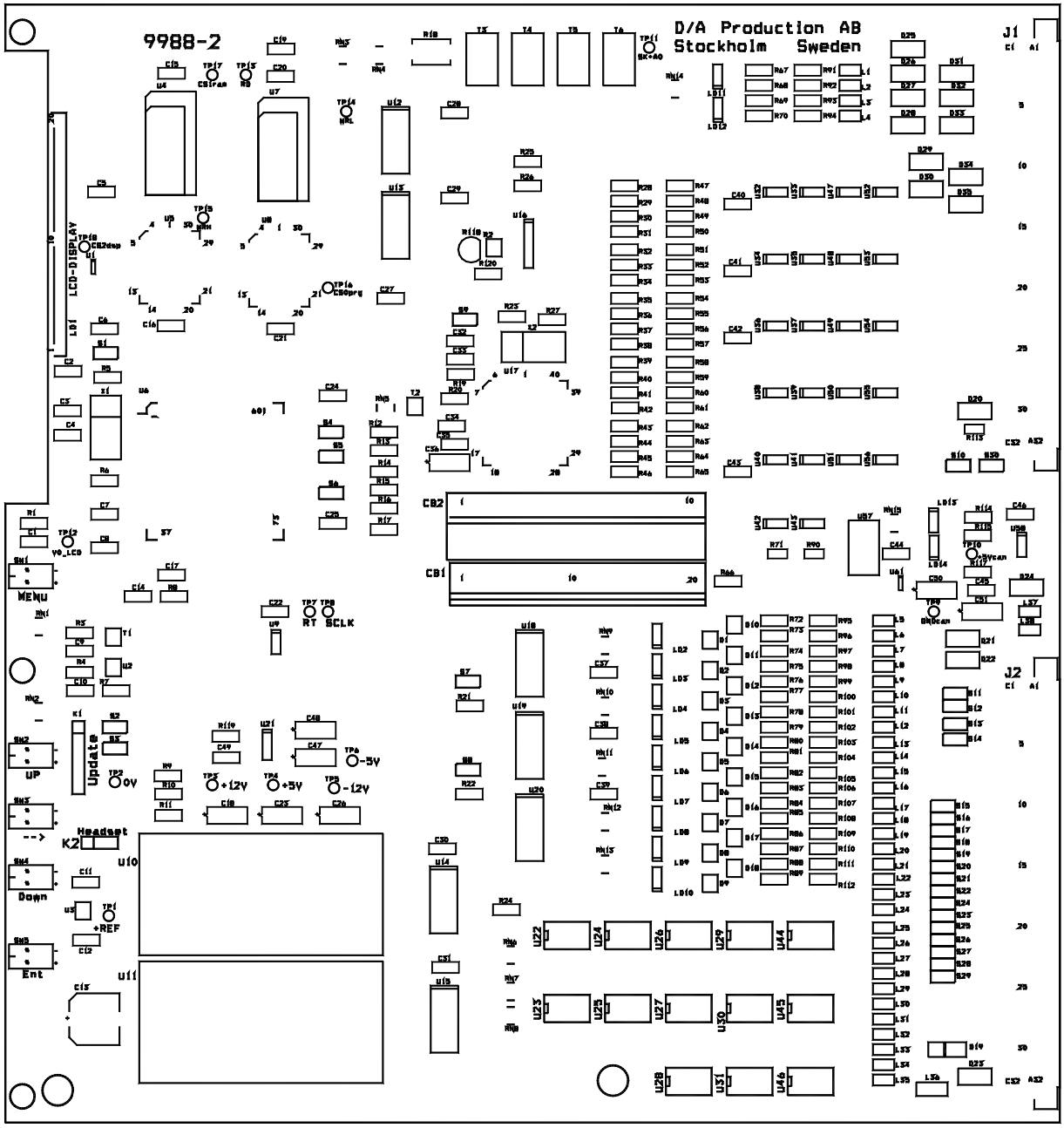
DISPLAY AND CONTROL UNIT FOR THE RMS-CD SYSTEM USERS MANUAL

Valmet

CONTENTS

1 LOCATION OF COMPONENTS 3
2 DESCRIPTION OF OPERATION 4
3 TECHNICAL SPECIFICATION 4
4 DESCRIPTION OF SIGNALS 5
4.1 General functions 5
4.2 Disc Clearance Regulator, conical zone 5
4.3 Disc Clearance Regulator, flat zone 6
4.4 DCA-setting function 7
4.5 Touch Point Calibration Signals 7
4.6 Control Motor, rotor (internal signals) 7
4.7 Serial Communication Interface 8
4.8 Feed Guard function 8
4.9 RMS internal interface 8
4.10 RMS Analogue signals 9
4.11 PDU-display signals 9
4.12 Spare signals 9
5 OUTLINE DRAWING 10

1 LOCATION OF COMPONENTS



2 DESCRIPTION OF OPERATION

The DCU-RM2 is a display and control unit for the RMS CD refiner system. The unit monitors and checks the readouts of the measured levels and the adjusted limit-values of all other units in the system.

The DCU-RM2 includes following functions:

- Normal read-out display for DCA, disc temperature and rotor position.
- Extended read-out for limit-display, settings and results.
- Two disc clearance regulators, one for the flat and one for the conical zone.
- Feed guard supervision function. This is accomplished by monitoring the feed guard reset signal, the stepping motor control signals and the rotor position signal.
- Menu-handling software for display selection and settings.
- The DC/DC power units, for conversion and isolation the 24 Vdc system power supply to internal +12V, -12V and +5V dc-voltages.

The menu-handling software is described in the Programmers Manual PRO-CD1.

The manual PAR-CD1 can be used to document all the programmed settings.

3 TECHNICAL SPECIFICATION

Article no:	DCU-RM1 / VAL0122830 / SKC9226067		
Power supply:	+24 Vdc, ±10%, 0.12 A max		
Internal supply:	±12 Vdc and +5 Vdc, isolated from the power supply		
Board dimension:	Height=234 mm, Depth=220 mm, Thickness =71 mm (14 TE)		
Panel signal indicator:	64 x 128 dots graphic display		
Panel switches:	5 push-button switches		
Digital inputs from the PLC-unit:			
	level: +24 Vdc	impedance: 5 kΩ	
Digital inputs from the RMS-units:			
	level: +5 Vdc	impedance: 1 kΩ	
Digital outputs to the PLC-unit:			
	level: +24 Vdc	type: pnp	max current: 50 mA
Digital outputs to the RMS-units:			
	level: +5 Vdc	type: pnp	max current: 50 mA
Analogue outputs to main system:			
	current, 4-20 mA, galvanically isolated		
Analogue inputs from main system:			
	current, 4-20 mA, ± 400V common mode range		
Analogue inputs from RMS units:			
	voltage, 1-5 Vdc, ± 400V common mode range		
Serial communication interface:			
	RS485, 31.24 kbaud, for the PDU-display		

4 DESCRIPTION OF SIGNALS

4.1 General functions

DO+DCURD DCU-unit ready Digital output toPLC
The ready output is active when DCU-unit is ready. The signal is delayed 8 seconds after start of the DCU. It will be active as long the power supplies is within specified limits.
DO+DCUSA DCU-sum alarm Digital output to PLC
The sum alarm output is active as long as no alarm from any other unit is detected. This is done by measuring the Analogue outputs from the activated units in the system. If it is out of a specified range for more than three seconds, a sum alarm is generated.
Some units have their own alarm outputs (CMI and DCA), and will therefore not be checked by the DCU-unit.

4.2 Disc Clearance Regulator, conical zone

DI+DCROc, Regulator On, conical Digital input from PLC
The conical zone regulator is enabled by the DI+DCROc signal from the PLC. It controls the refiner through the stepping motor until the DCA-value corresponds to an internal set-point value. If the signal is deactivated, all regulation activity is stopped. The regulator will not be activated if the sum alarm output is deactivated. It will also be deactivated if any DCU alarm output is deactivated.
The regulator can't be activated when the touch point function is activated. If touch point is activated when the regulator is active, the regulator is deactivated.
DI+DCRIc, Regulator, Increment internal set point, conical Digital input from PLC
An active input will increase the internal set-point value, if the DI+DCRRc is not active.
If held active, it will increase the value with 0.01 mm/s.
DI+DCRDc, Regulator, Decrement internal set point, conical Digital input from PLC
An active input will decrease the internal set-point value, if the DI+DCRRc is not active. If held active, it will decrease the value with 0.01 mm/s.
DI+DCRSc, Regulator, Set limit value from DCA-value, conical Digital input from PLC
An active input will copy the current DCA-value to the internal set-point value, if the DI+DCRRc is not active. This will not be executed if the DCA-value is outside the range 0.00 to 2.00 mm.
DI+DCRRc, Regulator, Remote set point value, conical Digital input from PLC
If the input is activated and the regulator is active, the remote Analogue set-point value is read into the internal set-point value . If the regulator is not active, the DCU and PDU displays will monitor the external instead of the internal set-point value, but it will not be read. The DI+DCRIc, DI+DCRDc or DI+DCRSc signals has no affect in this mode.
DI+DCU2, Regulator, stop together movement when low A-chamber pressure signal is active. Digital input from HPM
AI+DCRSc Analogue set-point value, conical + Analogue input from inst. syst.
AI-DCRSc Analogue set-point value, conical - Analogue input from inst. syst.
Analogue input for remote set point value (4-20 mA)
DO+DCRAc, Disc Clearance Regulator Alarm, conical Digital output to PLC
Regulator alarm output is normally activated, and will deactivate upon regulator alarm. Following cases will force the regulator alarm output: Set point alarm, under alarm or over alarm.
Set point alarm. If the external set-point value is out of the limits (0.00 - 2.00 mm) and the input DI+DCRRc is active, it will generate an alarm. The PDU-display will then indicate "REGULATOR ALARM", and the DCU indicates "SET POINT ALARM". The alarm state is reset by pressing the "ENTER" key.
Over alarm. The intention with this function is to prevent the regulator from forcing the plates together uncontrolled if for instance, the TDC-sensor malfunctions.
An internal register will count the actual movement by pulses from the CMI-unit, one pulse per 0.01 mm. Together will increase and apart will decrease the counter, and if it passes a programmable

limit, the unit will then generate the alarm. The limit is a percentage of the set point value (ex. setp. = 0.50, over alarm = 50 % =>> limit = 0.25). When an alarm occurs, the PDU-unit will indicate "REGULATOR ALARM" and the DCU-unit will indicate "OVER ALARM". Pressing the ”ENTER” key resets this alarm state. By the first movement together after the activation of the regulator, the total error (set point - DCA-value) is allowed to be regulated within one step, without any over alarm generated.
The movement is however limited to a maximum together movement, which is the error (the distance between the start point and the set point value) plus the over alarm limit.
A set point change bigger than ± 0.03 mm, will result in that the over alarm registers will be cleared and a new movement will be allowed as above. The register is decremented with a very slow clock frequency (speed limit) to simulate a nominal plate wear.
Under alarm. The purpose is to check that the equipment for moving the rotor corresponds to a moving command. An alarm register will count the successive number of regulations where the result is that the DCA-value is not within the dead band area. The check if the DCA-value is within the dead band, is done directly after the control motor movement is finished.
If the register passes the preset under alarm register, the unit will generate the alarm. The PDU-unit will indicate "REGULATOR ALARM" and the DCU-unit will indicate "UNDER ALARM". The alarm state is reset by pressing the "ENTER" key. A change of the set point value bigger than ± 0.03 mm, will reset the under alarm register.
Regulator settings. A set of variables must be configured for optimal performance. See the programmers manual for further details.

4.3 Disc Clearance Regulator, flat zone

The flat-zone regulator has the same control signals as the conical zone regulator. The suffix on the signal name is "f" instead of "c".

DI+DCROf	Regulator On, flat	Digital input from PLC
DI+DCRIf	Regulator, Increment internal set point, flat	Digital input from PLC
DI+DCRDf	Regulator, Decrement internal set point, flat	Digital input from PLC
DI+DCRSf	Regulator, Set limit value from DCA-value, flat	Digital input from PLC
DI+DCRRf	Regulator, Remote set point value, flat	Digital input from PLC
AI+DCRSf	Analogue set-point value, flat +	Analogue input from inst.syst.
AI-DCRSf	Analogue set-point value, flat -	Analogue input from inst.syst.
DO+DCRAf	Disc Clearance Regulator Alarm, flat	Digital output to PLC

DO+FZTO Move flat-zone discs together Digital output to the PLC
If the disc clearance regulator for the flat-zone is active, this output is activated to move the discs together. The duration of the pulse is dependent of the programmed AC-motor speed and the distance to move. The duration is also dependent of change of direction, to compensate for turnover play in the gearbox.
DO+FZAP Move flat-zone discs apart Digital output to the PLC
If the disc clearance regulator for the flat-zone is active, this output is activated to move the discs apart. The duration of the pulse is dependent of the programmed AC-motor speed and the distance to move the stator. The duration is also dependent of change of direction, to compensate for turnover play in the gearbox.

4.4 DCA-setting function

The DCA-unit is calibrated by digital signals instead of potentiometers.
This makes it possible to run a fully automatic calibration, which includes the touch point function.
These outputs are not used by the conventional manual calibration procedure.

ID+DSC DCA set course for DCA units' Digital output to the DCA-units
This output will go active to select the course setting.

ID+DSZ DCA set zero for DCA units' Digital output to the DCA-units
This output will go active to select the zero setting.

ID+DSS DCA set span for DCA units' Digital output to the DCA-units
This output will go active to select the span setting.

ID+DSEc DCA set enable for DCA unit, conical Digital output to the DCA-unit
This output will go active to select the conical-zone DCA-unit.

ID+DSEf DCA set enable for DCA unit, flat Digital output to the DCA-unit
This output will go active to select the flat-zone DCA-unit.

4.5 Touch Point Calibration Signals

DI+TPMA Touch point manual Digital input from the PLC
This signal is used to present the relative POM-value on the PDU-RM1 display unit during the calibration process. It is initiated when the digital input (DI+TPMA) is activated and the TVD unit is activated in the UNITS menu.

DI+TPAU Touch point automatic Digital input from the PLC
The signal is for future use. DI+TPSEL Touch point selection Digital input from the PLC
The signal is to select which zone to calibrate. Acitvate to select the flat zone, and deactivate to select the CD-zone.

DO+TPCO Touch point completed Digital output to the PLC
The signal is intended to monitor when a automatic touch point procedure is completed, but this function is not yet implemented.

DO+TPAL Touch point alarm Digital output to the PLC
The signal is an alarm output if a automatic touch point procedure fails. Not used.

D+SYNC Rotor Sync Digital input from the SSM-unit

4.6 Control Motor, rotor (internal signals)

ID+CMIAP Move discs apart Digital output to the CMI-unit
An active output will move the discs apart. The signal can only be active when the Disc Clearance Regulator is active.

ID+CMITO Move discs together Digital output to the CMI-unit
An active output will move the discs together. The signal can only be active when the Disc Clearance Regulator is active.

ID+CMIHS Move discs at high-speed Digital output to the CMI-unit
An active output will move the discs at high speed. The signal can only be active when the Disc Clearance Regulator is active.

ID+CMIDR Direction of movement signal Digital input from the CMI-unit
The signal will indicate in which direction the control motor is working.

ID+CMICL Clock signal for movement Digital input from the CMI-unit
The signal will indicate in which speed the control motor is working.

4.7 Serial Communication Interface

ID+SCI1	Not dedicated	Digital output to the SCI-unit
ID+SCI2	Not dedicated	Digital output to the SCI-unit
ID+SCI3	Not dedicated	Digital output to the SCI-unit
ID+SCI4	Not dedicated	Digital input from the SCI-unit
ID+SCI5	Not dedicated	Digital input from the SCI-unit

4.8 Feed Guard function

DI+FGRE Feed guard reset Digital input from the PLC

When the feed-guard-reset input (DI+FGRE) is deactivated, the unit starts the feed guard supervision function. It will immediately read the POM-value and indicate "FG (reset)" on the PDU display. The unit then counts the pulses from the CMI-unit and when the pulses correspond to the preset feed-guard-distance (piston length + safe distance), the unit stops the rotor movement by blocking the CMI unit. When the time in the TIMEOUT parameter has elapsed, the unit will read the POM-value again. The difference between the POM-values is then compared to a lower and a higher limit. The lower is 100% of the piston length + 50% of the safe distance and the higher is 100% of the piston length + 150% of the safe distance.

DO+FGCO Feed guard contact Digital output to the PLC

If the actual rotor travel is within the set limits, the feed-guard-contact output is set active, to verify a successful feed guard reset. The PDU display will indicate "FG (contact)", and the DCU-display will indicate control motor travel, measured travel, preset distance and actual rotor position.

DO+FGAL Feed guard alarm Digital output to the PLC

The feed-guard-alarm output (DO+FGAL) is normally set active, but it will be deactivated if the actual rotor travel after the feed guard is outside the limits. The PDU display will indicate "FG (alarm)", and the DCU-display will indicate control motor travel, measured rotor travel, preset distance and actual rotor position.

If no pulses are detected from the CMI-unit within the TIMEOUT, the unit will deactivate the feed-guard-alarm output. The PDU display will indicate "FG (alarm)" and the DCU-display will indicate "TIME ALARM".

An activated feed-guard-reset input will reset the PDU display, force the DCU display to the normal readout and reset the feed guard outputs to their normal state.

The DCU display will indicate the information for about 20 seconds, and return to the normal display readout.

4.9 RMS internal interface

SK+A0	Address 0	Digital output to the RMS-units
SK+A1	Address 1	Digital output to the RMS-units
SK+A2	Address 2	Digital output to the RMS-units
SK+RIN	Reset in	Digital output to the RMS-units
SK+RUT	Reset output	Digital input from the RMS-units
SK+AN	Analogue +	Analogue input from the RMS-units
SK-COM	Digital ground	Digital common to the RMS-units
COM	Analogue ground	Analogue common to the RMS-units
SK+SP	Spare	Spare signal to the RMS-units

4.10 RMS Analogue signals

U±DTMc	Disc Temperature Monitor, conical side	Analogue input from the DTM-unit
U±DTMf	Disc Temperature Monitor, flat side	Analogue input from the DTM-unit
U±DCAc	Disc Clearance Amplifier, conical side	Analogue input from the DCA-unit
U±DCAf	Disc Clearance Amplifier, flat side	Analogue input from the DCA-unit
U±POMc	Rotor Position Monitor, conical side	Analogue input from the POM-unit
U±POMf	Rotor Position Monitor, flat side	Analogue input from the POM-unit
U±TVDc	Touchpoint Vibration Detector, conical side	Analogue input from the TVD-unit
U±TVDf	Touchpoint Vibration Detector, flat side	Analogue input from the TVD-unit
U±VIM	Vibration Monitor	Analogue input from the VIM-unit
U±MPM	Motor Power Monitor	Analogue input from the MPM-unit
U±HPM	Hydraulic Pressure Monitor	Analogue input from the HPM-unit
U±OTM1	Optional Temp Monitor 1	Analogue input from the OTM-1-unit
U±OTM2	Optional Temp Monitor 2	Analogue input from the OTM-2-unit
U±SSM	Safeset monitor 1	Analogue input from the SSM-1-unit
U±ER1	ER-unit 1 (in the RMS-ER1 rack)	Analogue input from the ER-1 unit
U±ER2	ER-unit 2 (in the RMS-ER1 rack)	Analogue input from the ER-2 unit
U±ER3	ER-unit 3 (in the RMS-ER1 rack)	Analogue input from the ER-3unit
U±ER4	ER-unit 4 (in the RMS-ER1 rack)	Analogue input from the ER-4 unit

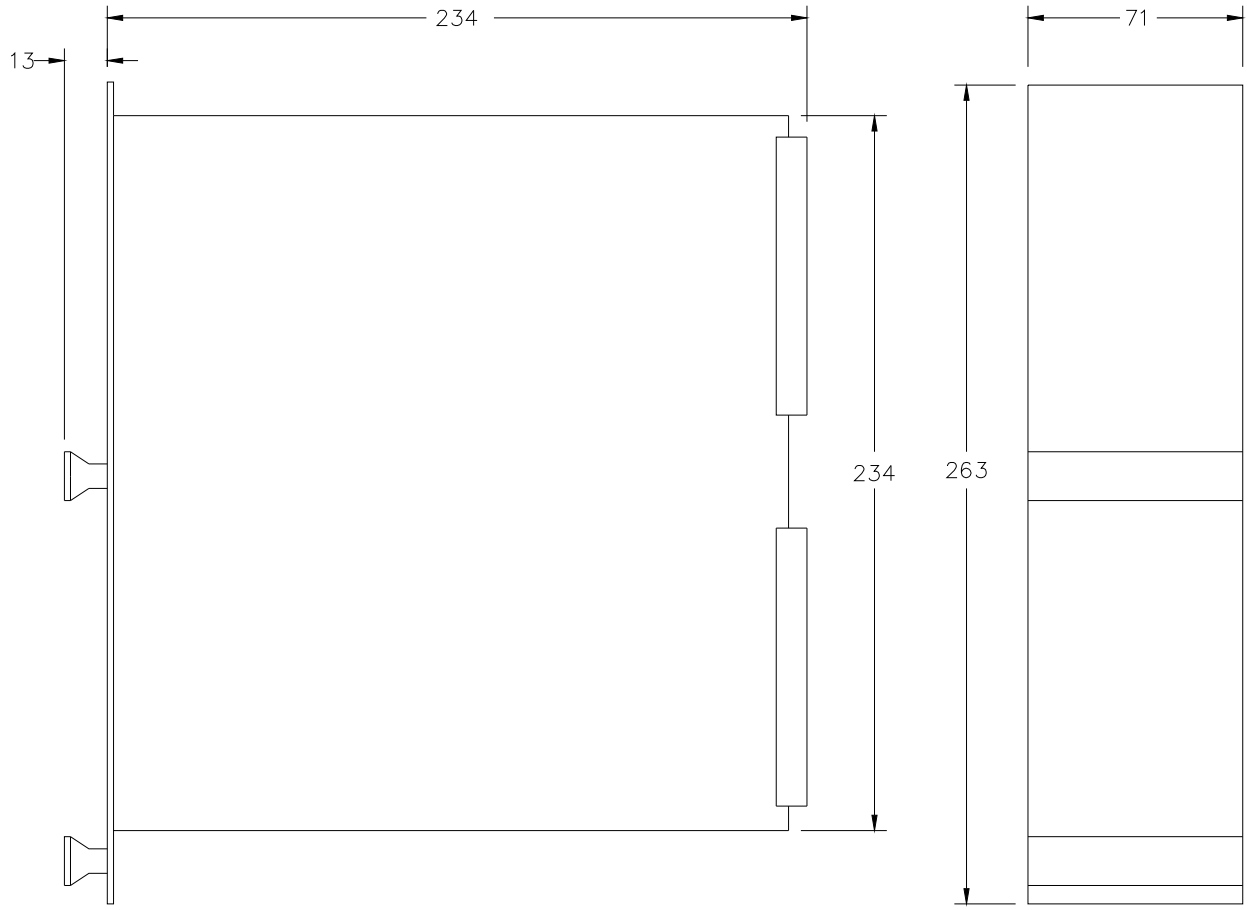
4.11 PDU-display signals

ID+PDU1	Serial communication output	Digital output to the PDU
ID+PDU2	Serial communication input	Digital input from the PDU
ID-PDU	Serial information common	Digital ground to the PDU

4.12 Spare signals

DI+DCU1	Digital input from the PLC
DI+DCU3	Digital input from the PLC
DO+DCU4	Digital output to the PLC
DO+DCU5	Digital output to the PLC
DO+DCU6	Digital output to the PLC

5 OUTLINE DRAWING



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