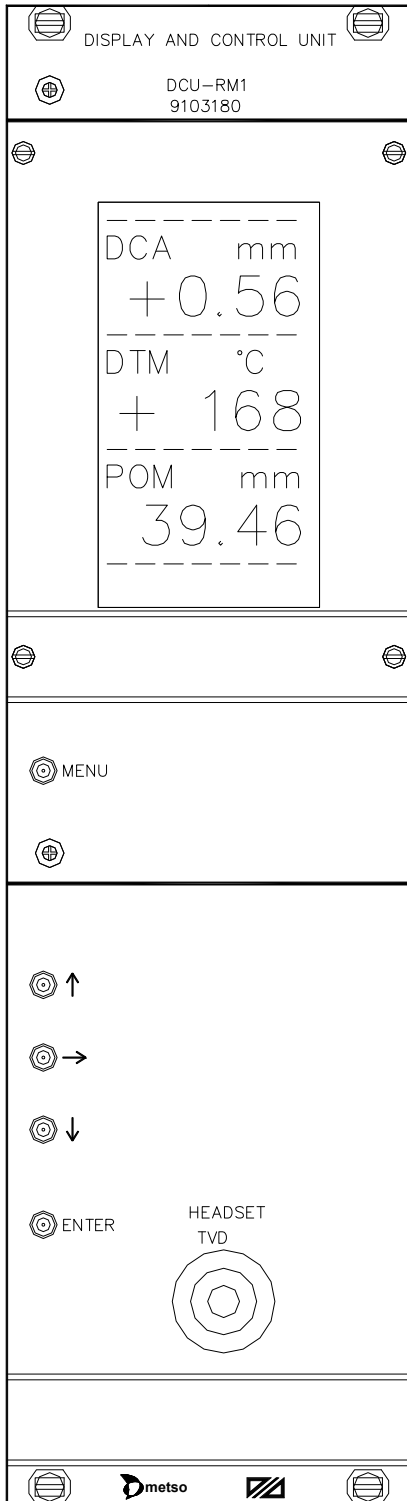




DCU – RM1

VAL0100517 / SKC9103180



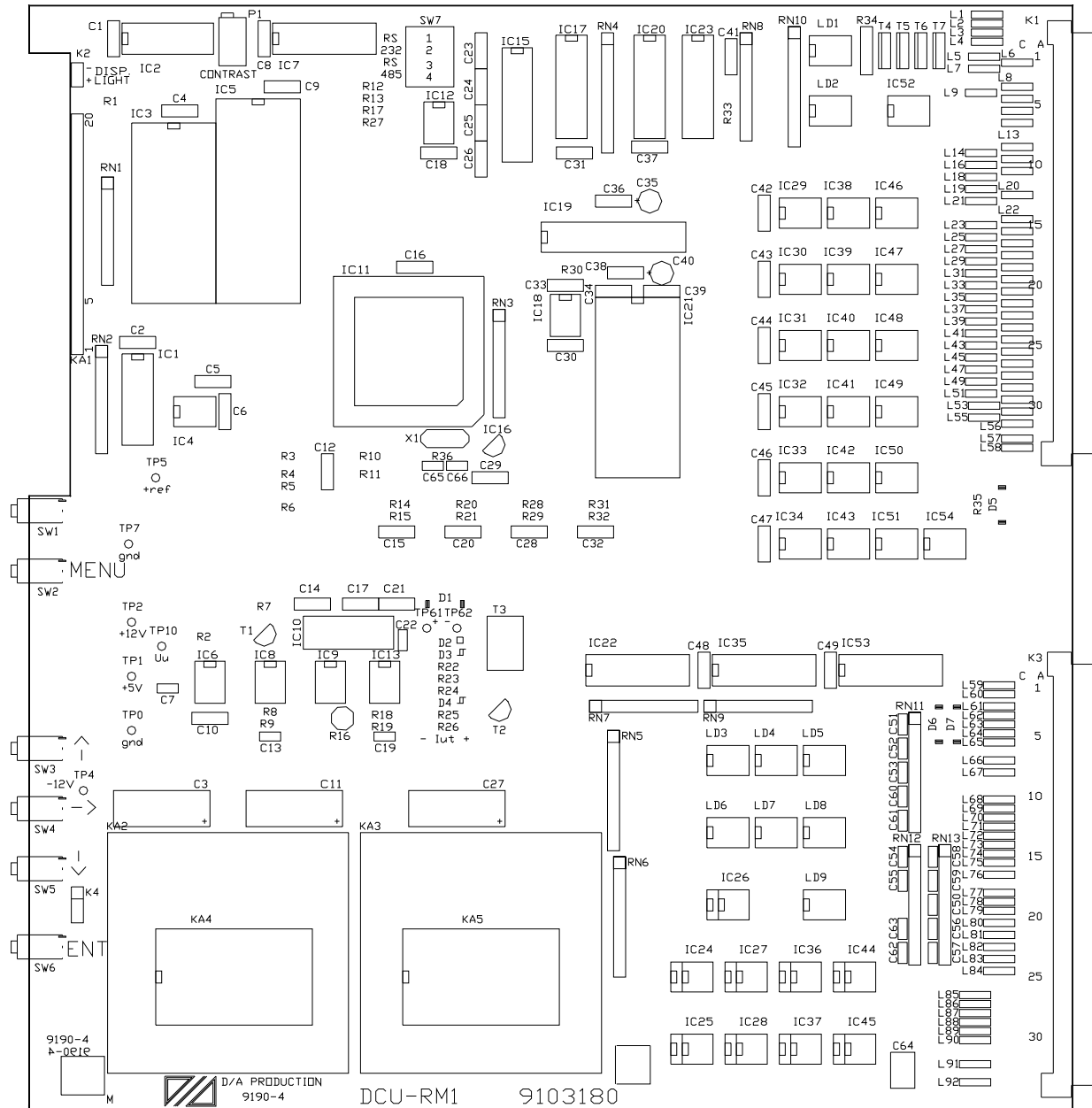
DISPLAY AND CONTROL UNIT FOR THE RMS-SYSTEM USERS MANUAL



CONTENTS

1	LOCATION OF COMPONENTS	3
2	DESCRIPTION OF OPERATION	3
3	TECHNICAL SPECIFICATION.....	4
4	SIGNAL DESCRIPTION	4
4.1	General functions	4
4.2	Disc Clearance Regulator function	4
4.3	DCA calibration function.....	5
4.4	Relative POM-indication function.....	5
4.5	Stepping Control motor function (Single Disc or Conflo).....	6
4.6	Feed Guard function.....	6
4.7	Touch point calibration function.....	6
4.8	RMS internal interface	7
4.9	RMS analog signals	7
4.10	PDU-display signals	7
4.11	Spare signals.....	7
5	OUTLINE DRAWING	8
6	CONTACT	8

1 LOCATION OF COMPONENTS



2 DESCRIPTION OF OPERATION

The DCU-RM1 is a display and control unit for the RMS 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-RM1 includes following functions:

- Normal read-out display for DCA, disc temperature and rotor position.
- Extended read-out for limit-display, settings and results.
- Disc clearance regulator.
- Feed guard monitor, by reading the rotor position unit.
- 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-SD1.

3 TECHNICAL SPECIFICATION

Article no:	DCU-RM1 / VAL0100517 / SKC9103180
Power supply:	+24 Vdc, 10 %, max 0.12 A
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, Ttype: pnp, Max current: 50 mA
Digital outputs to the RMS-units:	Level: +5 Vdc, Type: pnp, max current: 50 mA
Analog outputs to main system:	Current, 4-20 mA, Galvanic isolated
Analog inputs from main system:	Current, 4-20 mA, Galvanic isolated
Analog inputs from RMS units:	Voltage, 1-5 Vdc, ± 200V common mode range

4 SIGNAL DESCRIPTION

4.1 General functions

The ready output is active when DCU-unit is ready. The signal is delayed 8 seconds after start of the DCU. The alarm output is active as long as no alarm of any other unit is detected.

If the input voltage on any unit that is enabled in the UNITS menu is lower than 0.6V or higher than 5.3V, the internal check system register the unit. If the unit is out of range for three seconds, a sum alarm (DO+DCUSA) is generated.

Signal name	Type	Description	to/from
DO+DCURD	Digital output	DCU unit ready	PLC
DO+DCUSA	Digital output	DCU sum alarm	PLC

4.2 Disc Clearance Regulator function

The regulator is enabled by the DI+DCRON 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 alarm output, (DO+DCRAL) is normally activated. If the DI+DCRAS signal is active while the regulator is active, an external analog set-point value from the instrumentation system is read into the internal set-point value. The DI+DCRIN, DI+DCRDE or DI+DCRST signals do not affect the value in this mode.

If the DI+DCRAS signal is not active, the reading of the external set-point value is inhibited, and the value can then be increased (an active DI+DCRIN signal), decreased (DI+DCRDE) or be set to the current DCA-value (DI+DCRST).

The internal value is always monitored as an output current signal (4-20 mA).

If the DCA-value is negative, the regulator reads the value as 0.00 mm.

By the first together movement after the activation of the regulator, the whole 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 under- and over alarm registers will be cleared and a new movement will be allowed as above. The regulator can't be activated when the touch point function is activated. If touch point is activated when the regulator or the menus are activated, the regulator or the menus are deactivated.

Set point alarm. If the external set-point value is out of the limits (0.00 - 2.00 mm), the unit will deactivate the alarm output, (DO+DCRAL). The PDU-display indicates "REGULATOR ALARM", and the DCU indicates "SET POINT ALARM". Pressing the "ENTER" key resets the alarm state.

Under alarm. An alarm register will count the successive number of regulations that are not within the dead band area, and if the register passes the preset under alarm register, the unit will output the alarm. The PDU-unit will indicate "REGULATOR ALARM" and the DCU-unit will indicate "UNDER ALARM". Pressing the "ENTER" key resets the alarm state. A change of the set point value bigger than +/-0.03 mm, will reset the under alarm register.

The check if the DCA-value is within the dead band, is done directly after the control motor movement is finished.

Over alarm. An internal register will count the actual together movement by pulses from the CMI-unit, one pulse per 0.01 mm. Together increases and apart decreases the counter. If the counter passes a programmable limit, the unit will output the alarm. The limit is a percentage of the set point value, where the percentage is settled by the preset over alarm value (ex. Set point = 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. A change of the set point value bigger than ± 0.03 mm, will reset the over alarm register. The register is decremented with a very slow clock frequency (speed limit) to simulate a nominal plate wear.

Regulator settings. A set of variables must be configured for optional performance. See the programmer's manual for further details.

Signal name	Type	Description	to/from
DI+DCRON	Digital input	Enable disc clearance regulator	PLC
DI+DCRIN	Digital input	Increment set-point value	PLC
DI+DCRDE	Digital input	Decrement set-point value	PLC
DI+DCRST	Digital input	Set the DCA-value to the set-point value	PLC
DI+DCRAS	Digital input	Enable analog set-point value	PLC
DI+DCU2	Digital input	Stop together movement when low A-chamber pressure signal is active	HPM
DO+DCRAL	Digital output	Regulator Alarm	PLC
AI+DCRSV	Analog input +	Analog set-point value, (4-20 mA)	SYSTEM
AI-DCRSV	Analog input -	Analog set-point value, (4-20 mA)	SYSTEM
AO+DCRSV	Analog output +	Analog set-point value, (4-20 mA)	SYSTEM
AO-DCRSV	Analog output -	Analog set-point value, (4-20 mA)	SYSTEM

4.3 DCA calibration 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 a conventional manual calibration.

Signal name	Type	Description	to/from
ID+DSE	Digital output	DCA set enable	DCA-unit
ID+DSC	Digital output	DCA set course	DCA-unit
ID+DSS	Digital output	DCA set span	DCA-unit
ID+DSZ	Digital output	DCA set zero	DCA-unit

4.4 Relative POM-indication function

The PDU-RM1 can indicate a relative POM-value during the calibration process. It is initiated when the digital input (DI+TPMA) is activated. The TVD unit must be activated in the UNITS menu, to be able to activate this function.

Signal name	Type	Description	to/from
DI+TPMA	Digital input	Pouch point manual	PLC

4.5 Stepping Control motor function (Single Disc or Conflo)

The stepping motor can be controlled from either the PLC-unit or from the DCU-unit. The CMI-unit has separate inputs for each unit. The signals from the DCU-unit can only be active when the Disc Clearance Regulator is active. A direction signal (D+CM DIR) and a clock signal (D+CM CLO) can be monitored by the DCU-unit for exact axial rotor movement.

Signal name	Type	Description	to/from
ID+CMIAP	Digital output	Move discs apart	CMI-unit
ID+CMITO	Digital output	Move discs together	CMI-unit
ID+CMIHS	Digital output	Move discs at high speed	CMI-unit
ID+CMIDR	Digital input	Control motor direction	CMI-unit
ID+CMICL	Digital input	Control motor clock	CMI-unit

4.6 Feed Guard function

The feed-guard-alarm output (DO+FGAL) is normally set active. When the feed-guard-reset input (DI+FGRE) is deactivated, the unit immediately reads the POM-value and "FG (reset)" is indicated on the PDU display. The unit then count the pulses from the CMI-unit and when the pulses correspond to the preset feed-guard-distance (piston length plus safe distance), it will force the CMI unit to a stop. When the time set in the "TIMEOUT" parameter has elapsed, the DCU unit will then read the POM value again. The actual rotor travel is then compared to two set limits, one lower and one higher limit. The lower is 100% of the piston length plus 50% of the safe distance and the higher is 100% of the piston length plus 150% of the safe distance. If it is within the set limits, the feed-guard-contact output (DO+FGCO) is set active, "FG (contact)" is indicated on the PDU display and the DCU-display will indicate control motor travel, measured travel, preset distance and actual rotor position. If not, the feed-guard-alarm output (DO+FGAL) is deactivated, "FG (alarm)" is indicated on the PDU display and the DCU-display will indicate control motor travel, measured travel, preset distance and actual rotor position.

An activated feed-guard-reset will reset the PDU display and show the normal readout instead and activate the feed-guard-alarm output or deactivate the feed-guard-contact output.

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

The information on the DCU display is displayed for 20 seconds, and then is the normal readout displayed.

Signal name	Type	Description	to/from
DI+FGRE	Digital input	Feed guard reset	PLC
DO+FGCO	Digital output	Feed guard contact	PLC
DO+FGAL	Digital output	Feed guard alarm	PLC

4.7 Touch point calibration function

The RMS-system is prepared to do a fully automatic self-calibration in the future.

An active automatic calibration input (DI+TPAU) performs a stand-alone calibration procedure.

Several analogue and digital signals are monitored to guarantee fail-safe operation.

Signal name	Type	Description	to/from
DI+TPAU	Digital input	Touch point calibration automatic	PLC
DI+TPMA	Digital input	Touch point calibration manually	PLC
DO+TPAL	Digital output	Touch point calibration alarm	PLC
DO+TPCO	Digital output	Touch point calibration completed	PLC

4.8 RMS internal interface

Signal name	Type	Description	to/from
SK+A0	Digital output	Address 0	RMS-units
SK+A1	Digital output	Address 1	RMS-units
SK+A2	Digital output	Address 2	RMS-units
SK+RIN	Digital output	Reset in	RMS-units
SK+RUT	Digital input	Reset output	RMS-units
SK+AN	Analog input	Analog +	RMS-units
SK-AN	Analog input	Analog -	RMS-units
SK-COM	Digital common		RMS-units
COM	Analog common		RMS-units
SK+SP	Spare signal		RMS-units

4.9 RMS analog signals

Signal name	Type	Description	to/from
U+DTM1	Analog input	Disc Temperature Monitor	DTM
U+DCA1	Analog input	Disc Clearance Amplifier	DCA
U+POM1	Analog input	Rotor Position Monitor	POM
U+TVD1	Analog input	Touch point Vibration Detector	TVD
U+VIM	Analog input	Vibration Monitor	VIM
U+MPM	Analog input	Motor Power Monitor	MPM
U+HPM	Analog input	Hydraulic Pressure Monitor	HPM
U+OTM1	Analog input	Optional Temp Monitor 1	OTM-1
U+OTM2	Analog input	Optional Temp Monitor 2	OTM-2
U+OTM3	Analog input	Optional Temp Monitor 3	OTM-3
U+OTM4	Analog input	Optional Temp Monitor 4	OTM-4
U+OTM5	Analog input	Optional Temp Monitor 5	OTM-5
U+OTM6	Analog input	Optional Temp Monitor 6	OTM-6
U+SS	Analog input	Safeset monitor 1	SSM-1
U+SS2	Analog input	Safeset monitor 2	SSM-2
U+X	Analog input	Spare	
U+SD	Analog input	Spare	

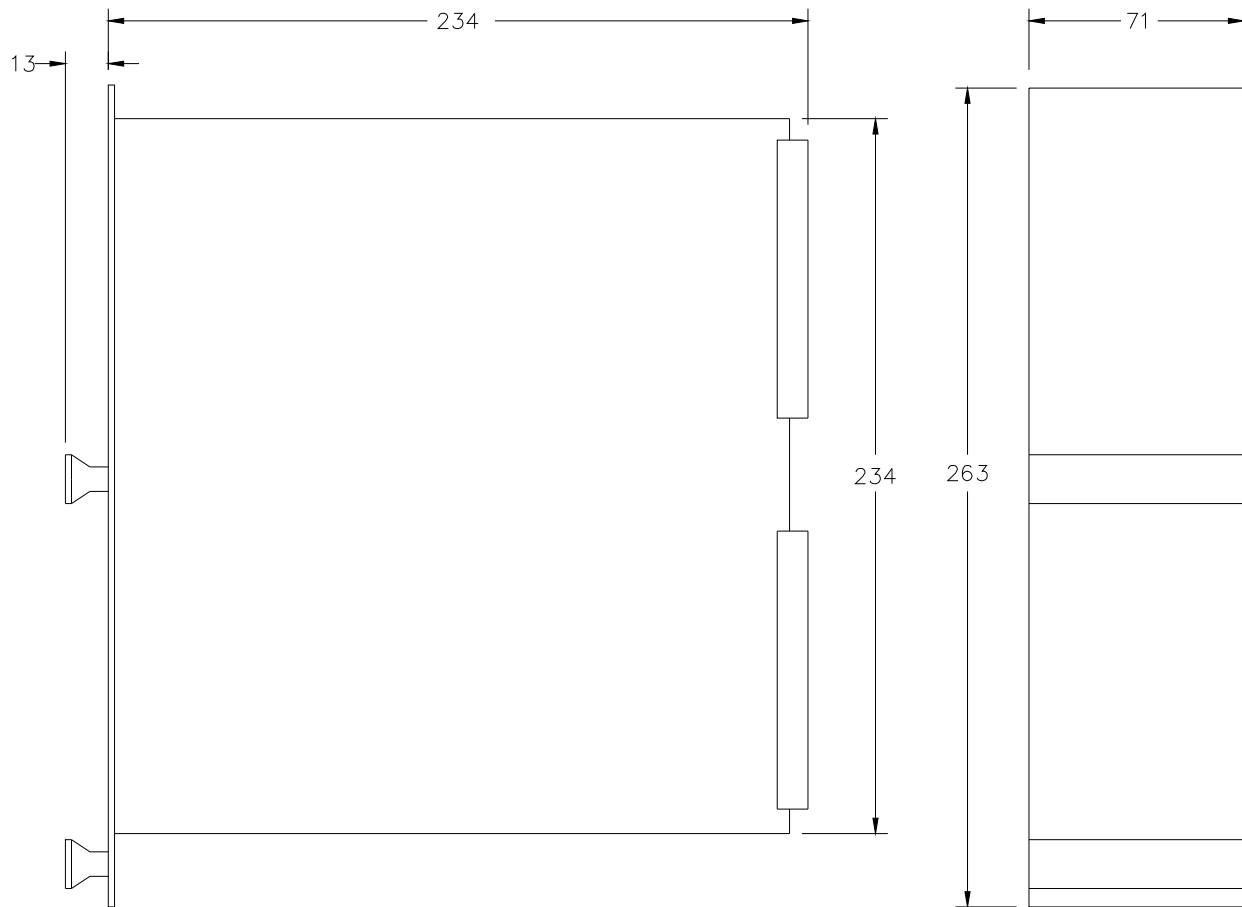
4.10 PDU-display signals

Signal name	Type	Description	to/from
ID+PDU1	Digital output	Serial information output	PDU
ID+PDU2	Digital output	Serial information input	PDU
ID-PDU	Digital input	Serial information common	PDU

4.11 Spare signals

Signal name	Type	Description	to/from
DO+DCU7	Digital output		
DO+DCU8	Digital output		
DI+SYNC	Digital input		
DI+DCU3	Digital input		
DI+DCU4	Digital input		
DI+DCU5	Digital input		

5 OUTLINE DRAWING



6 CONTACT

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