



GMS-V1X0X RMC Function

Content

1	GENERAL	1
2	OPERATION	2
3	CALIBRATION	2
3.1	Static	2
3.2	Manual.....	2
3.3	Automatic	2
3.4	PLC control.....	3
4	PARAMETERS	3
5	PLC/DCS CONTROL.....	3
5.1	Control signal from PLC to BRM/RMC:	3
5.2	Manual static production position from PLC to BRM/RMC:.....	4
5.3	Operation state value from BRM/RMC to PLC:	4
5.4	Calibration state value from BRM/RMC to PLC:	4
5.5	RMC Production position from BRM/RMC to PLC:.....	5
5.6	RMC Plate wear from BRM/RMC to PLC:.....	5
6	PLC CONTROLLED CALIBRATION	5
6.1	PLC Static touch calibration	5
6.2	PLC Manual touch calibration.....	5
6.3	PLC Automatic touch calibration	6
7	CALIBRATION ON PDU-PM71	6
8	DOCUMENT REVISION	6
9	CONTACT.....	6

1 General

This document describes the RMC-function regarding the operation and calibration modes.

RMC in a GMS-V1X0X-system is handled by the BRM-DM1 unit.

Parameters are changed and the operation is controlled by using the display and pushbuttons on the BRM module. The RMC calibration procedure can also be controlled via PLC or a panel display. To be able to use the RMC functionality together with a panel display (PDU-PM7x), a software version of 1.28 or later is required in the BRM-DM1 unit.

2 Operation

The operation mode is controlled by the parameter [RMC Function].

- Off No operation
- Static The operation is static and is controlled by the parameter [RMC Set prod.pos].
In this mode the operator must preset the [RMC Set prod.pos] parameter to a chosen value.
The production start position is the sum of the [RMC Prod. Pos] value and the [RMC Start offset] parameter value. The production start position is an internal value and cannot be read on the display.
- Dynamic The operation is dynamic meaning that the last (and lowest) POM value during production is used as the production position "Prod. Pos." value.
To save a new value, a minimum level of motor load at a minimum time span must be passed.

The RMC position is indicated either by a logic output (HW mode), a state signal value (PLC mode) or in text on the panel display.

In HW mode, the output signal indicates whether POM is outside the production start position or not.

Low value when POM is lower than the production start position value.

High value when POM is higher than the production start position value.

In PLC Mode, the RmcOpState signal holds the information.

<i>bit</i>	<i>FALSE</i>	<i>TRUE</i>
0.0	RMC is deactivated	RMC activated
0.1	POM or TVD alarm	POM & TVD Ok (RMC ready)
0.2	$POM < ProdPosValue + ProdPosOffset$	$POM > ProdPosValue + ProdPosOffset$
0.3	$POM < ProdPosValue$	$POM > ProdPosValue$

3 Calibration

The calibration mode is controlled by the parameter [RMA Touchp.func.].

3.1 Static

The static calibration means the plates are brought together, with main motor off, to a chosen hydraulic pressure. The operator then sets this position as the production position. The static calibration can be used as a pre-calibration which are used when doing a manual or automatic calibration at a later stage.

3.2 Manual

In this mode the operator runs the plates manually, first to the touch position and then to the production start position. The main motor must be running to be able to measure the plate touch position by a vibration transducer.

The mode is normally activated by an activated hardwired input.

3.3 Automatic

The operator runs the plates together to the touch position and stops when told to do so (a preset TVD-value has been detected and passed). The plates are then automatically backed off to the production start position.

The mode is normally activated by an activated hardwired input.

3.4 PLC control

The PLC controls the calibration mode and any of the methods above can be used. No hardwired inputs are needed.

4 Parameters

The following parameters are used. The text within brackets indicates the parameter indicator on the BRM display.

Function [RMC] (Rotor Move Ctrl) has the following parameters:

[RMC Function]	Select between: Off, Static op. and Dynamic op.
[RMC Prod. Pos.]	This is the current <u>production position</u> .
[RMC Start offset]	Start offset. A distance added to the <u>production position</u> to set <u>production start position</u> .
[RMC Set prod.pos]	Set static production position set. Set to 0 (zero= to use the dynamic RMC. Set to any value (except 0) and use this value as the <u>production position</u> .
[RMC Power limit]	Minimum motor power to be able to set a new <u>production position</u> . The time limit must also be passed (see next parameter).
[RMC Time limit]	Minimum time (minutes) to set a new <u>production position</u> . The power limit must also be passed (see previous parameter).
[RMC Max prod.pos]	The max allowed <u>production position</u> value. A higher value is not allowed.
[RMC Min prod.pos]	The min allowed <u>production position</u> value. A lower value is not allowed.

Function [RMA] (Rotor Move Adj.) has the following parameters:

[RMA Touchp.func.]	Type of RMC calibration. Select between [Static], [Manual], [Automatic], [PLC ctrl.].
[RMA Touchp.level]	Min level of TVD to determine a touch.
[RMA Touchp.time]	Min time to determine a touch.
[RMA Touchp. Pos.]	Pom value at the touch position during calibration.
[RMA Wear setting]	Set to 0 to disable plate wear measurement. Set to 2 at segment change which will set [RMA Wear offset] to 0.00.
[RMA Wear offset]	Rotor position at the first production position with new plates.

5 PLC/DCS Control

The RMC function can also be partly controlled by a PLC/DCS. The basic function is set up by the [RMC Function] parameter but the calibration mode can be remote controlled. The remote control is enabled by adding an external fieldbus converter which communicates with the BRM unit over the CAN bus. The field buses Profinet IO, Profibus DP, Ethernet IP and Modbus TCP are used today.

Set the parameter [RMA Touchp.func.] to the [PLC ctrl.cal.] value to enable this feature.

The addresses of the control signals used are specified in a separate document and below is the content of the signals described.

5.1 Control signal from PLC to BRM/RMC:

RmcControlMode (8 bit byte).

<i>Bit</i>	<i>Hex</i>	<i>Description</i>
0.0	0x01	Enable a static RMC touch sequence.
0.1	0x02	Enable a manual RMC touch sequence.
0.2	0x04	Enable an automatic RMC touch sequence.
0.3	0x08	Set signal (activate momentarily to preset a POM value as the <u>production position</u> value.
0.4	0x10	Tvd gain select, 0 = idle gain, 1 = production gain.
0.5	0x20	Plate change. Set to 1 during the plate change session. This signal will preset the [RMC Set prod.pos] and reset the [RMA Wear offset] parameters.

- 0.6 0x40 Preset plate wear offset according to the production position value.
The signal can be activated any time and will use the current production position value as the plate wear offset value. A 1.0 s pulse is enough to preset the value.
- 0.7 0x80 Not used.

5.2 Manual static production position from PLC to BRM/RMC:

A 4-byte float indication the manual static production position set from PLC.

In normal mode this value should be set to 0.00.

5.3 Operation state value from BRM/RMC to PLC:

RmcOpState (8 bit byte).

<i>bit</i>	<i>FALSE</i>	<i>TRUE</i>
0.0	RMC is deactivated	RMC activated
0.1	POM or TVD alarm	POM & TVD Ok (RMC ready)
0.2	POM < ProdPosValue+ProdPosOffset	POM > ProdPosValue+ProdPosOffset
0.3	POM < ProdPosValue	POM > ProdPosValue.

Remarks: If 0.0 is false then 0.1, 0.2 and 0.3 are false.

A true state on bit 0.1 does not affect other bits.

If POM > ProdPosValue+ProdPosOffset then both 0.2 and 0.3 are true.

5.4 Calibration state value from BRM/RMC to PLC:

RmcCalState (8 bit byte).

<i>Hex</i>	<i>State description</i>
0x00	Not used.
0x01	Not used.
0x02	Not used.
0x04	Not used.
0x08	Not used.

0x10 – 0x4F RMC in PLC controlled calibration mode

Static Calibration

0x10	Static calibration mode selected.
0x11	Set <u>production position</u> accepted and static calibration complete.

Manual Calibration

0x20	Manual calibration mode selected.
0x21	TVD > [RMA Touchp.level] in manual calibration mode.
0x22	TVD > [RMA Touchp.level], time > [RMA Touchp.time] and a new [RMC Prod. Pos] (production position) is saved.
0x24	Operator opens the plates.
0x26	Operator opens the plates. The POM indicates that the gap is outside the <u>production position</u> and inside the <u>production start position</u> .
0x27	The POM indicates that the gap is outside the <u>production start position</u> . Waiting for operator to stop opening the plates.
0x28	Operator has stopped opening the plates. Manual calibration complete.

Automatic Calibration

0x40	Automatic calibration mode selected. TVD < [RMA Touchp.level]
0x41	TVD > [RMA Touchp.level], time < [RMA Touchp.time].
0x42	TVD > [RMA Touchp.level], time > [RMA Touchp.time] and a new [RMC Prod. Pos] (production position) is saved.
0x43	Wait until operator has stopped to close the gap.

0x44	CMD open the plates.
0x45	CMD stopped (from opening the plates). The POM indicates that the gap is inside the <u>production position</u> .
0x46	The POM indicates that the gap is outside the <u>production position</u> and inside the <u>production start position</u> .
0x47	The POM indicates that the gap is outside the <u>production start position</u> .
0x50	RMC in plate change mode.
0x80 – 0x84	<i>RMC in BRM calibration mode (not PLC controlled)</i>
0x80	RMC in automatic cal. mode (not in PLC control).
0x81	RMC in manual cal. mode (not in PLC control).
0x82	RMC in static cal. mode (not in PLC control).
0x84	RMC in faulty cal. mode.
0x88	Not used.

5.5 RMC Production position from BRM/RMC to PLC:

A 4-byte float gives the production position of the RMC

5.6 RMC Plate wear from BRM/RMC to PLC:

A 4-byte float indicates the plate wear value of the RMC. Negative values are indicated as 0.00.

6 PLC controlled calibration

6.1 PLC Static touch calibration

The refiner is stopped. RmcControlMode = 0x01.

RmcState	Value/parameter	Description	Operator
0x10		Searching the static touch point.	Close the plates.
0x10	HPM-B > limit	HPM-B passes a chosen level.	Stop plates!
0x10	Set value	RmcControlMode = .0x09 (0x01 + 0x08)	Push a button to set the <u>production position</u>
0x10	Set value	RmcControlMode = 0x41 or 0x49 (0x01 + 0x40) or (0x09+x040)	Push a button to preset the plate wear offset.
0x11	ProdPos = POM	The <u>production position</u> accepted. Static calibration complete	Open the plates Set RmcControlMode to 0x00 to exit.

6.2 PLC Manual touch calibration

The refiner is running in idle mode. RmcControlMode = 0x02.

The operator controls the plates in all states.

RmcState	Value/parameter	Description	Operator
0x20	[RMA Touchp.level] [RMA Touchp.time]	Is good, like 40%. Is good, like 1.0s	Check the settings of the parameters. Check the touch point level Check the touch point time
	POM is reduced	Searching the touch point.	Close the plates.
0x21	TVD > level	TVD value is higher than the set touch point level.	Stop plates!
0x22	TVD > level and TVD time > limit ProdPos = POM	TVD value is higher longer than the set time limit. The current POM value is stored as the <u>production position</u> .	-
0x24	Open plates	-	Open the plates
0x26	POM > <u>production position</u>	-	Open the plates
0x27	POM > <u>production start position</u>	-	Stop opening the plates

0x28	POM > <u>production position</u>	Operator has stopped opening the plates. Manual calibration complete	Set RmcControlMode to 0x00 to exit.
------	----------------------------------	--	-------------------------------------

6.3 PLC Automatic touch calibration

The refiner is running in idle mode. RmcControlMode = 0x04.

In **RmcState** 0x44: the BRM unit controls the plates. All other **RmcState**'s: the operator controls the plates

RmcState	Value/parameter	Description	Operator
0x40	[RMA Touchp.level] [RMA Touchp.time]	Is good, like 40%. Is good, like 1.0s	Check the settings of the parameters. Check the touch point level Check the touch point time
	POM is reduced	Searching the touch point.	Close the plates.
0x41	TVD > level	TVD value is higher than the set touch point level.	Stop plates!
0x42	TVD > level and TVD time > limit ProdPos = POM	TVD value is higher longer than the set time limit. The current POM value is stored as the <u>production position</u> .	-
0x44	Open plates	BRM opens the plates	-
0x45	POM < <u>production position</u>	-	-
0x46	POM > <u>production position</u>	-	Open the plates
0x47	POM > <u>production start position</u>	Automatic calibration complete.	Set RmcControlMode to 0x00 to exit.

7 Calibration on PDU-PM71

The RMC function can be monitored and controlled via the PDU-PM71 panel display together with HW logic inputs. The operator is guided through the various calibration modes (Static, Manual or Automatic, as described above) via instructions on the display. For further information regarding the usage of the PDU-PM71 panel display, see the *PDU-PM71 Manual*.

8 Document revision

Dec. 19, 2019/BL	First edition.
Jan. 2, 2020/BL	Revised.
Jan 29, 2020/BL	Added parameter for Rmc op state.
Sept 9, 2020/JL	Revised, added info on PDU-PM71

9 Contact

Sales, development, production and service:

Dametric AB

Jägerhorns Väg 19, SE 141 75 Kungens Kurva, Sweden

Phone: +46-8 556 477 00

E-Mail: service@dametric.se

Website: www.dametric.se

dametric 

Valmet 