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Manual/automatic mode changeover at the BOP connected to MICROMASTER 440 and SINAMICS G120

SIEMENS

MICROMASTER 440 and SINAMICS G120

Item-ID: 32054401

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1 Overview

A Basic Operator Panel (BOP) for MICROMASTER 440 or SINAMICS G120 can be re-parameterized so that it has the functions of the **"Hand"** 

and **"Auto"** 

keys of the BOP-2 for MICROMASTER 430 to change over (toggle between) manual/automatic modes.

The **"Reversing"**  and **"JOG"** 

keys of the BOP can be used for this purpose. Both or one of these keys can be re-parameterized.

Basic Operator Panel (BOP)

Basic Operator Panel (BOP-2)

The standard functions of the **"Reversing"**  and **"JOG"** 

keys of the BOP and **"Hand"** 

and **"Auto"** 

of the BOP-2 are listed in the following table.

Table 1-1 Standard functions of the keys

Button	Function	Effects
 **BOP**	Direction reversal	To reverse the direction of rotation of the motor, press this key. The opposing direction is displayed using the minus character (-) or by the flashing decimal point. In the default setting this function is de-activated.
 **BOP**	Jog motor	In the "Ready to power-on" state, when this key is pressed, the motor starts and rotates with the pre-set jog frequency. The motor stops when the key is released. When the motor is rotating, this key has no effect.
 **BOP-2**	Manual mode	Manual operation is selected by pressing the button. The drive inverter is then controlled from the sources P0700[1] (command source) or P1000[1] (setpoint source). The following applies for the pre-setting: Manual operation deactivated (CDS 2 deactivated) CDS 2 : P0700[1] = 1 (BOP-2) P1000[1] = 1 (MOP)
 **BOP-2**	Automatic mode	The automatic mode is selected by pressing the button. The drive inverter is then controlled from the sources P0700[0] (command source) or P1000[0] (setpoint source). The following applies for the pre-setting: Automatic mode activated (CDS 1 activated) CDS 1 : P0700[0] = 2 (terminals) P1000[0] = 2 (ADC)

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2 Parameterization of the frequency inverter

The "Auto" and "Hand" keys of the BOP-2 are used to change over (toggle between) the automatic and manual modes in the MM430 frequency inverter. To do this, parameter *P0718 CO/BO: Manual/Auto* is changed from 0 to 1 and two command data sets are toggled between (CDS1 and CDS2).

Parameter P0718 is selected in parameter *P0810 BI: CDS Bit0 (local / remote)* as standard setting for the command source to change over (toggle between) the command data sets in the MM430.

The standard settings for the command and setpoint sources are as follows:

Automatic mode (CDS1):

P0700[0] = 2 // Terminals

P1000[0] = 2 // Analog setpoint

Manual mode (CDS2):

P0700[1] = 1 // BOP

P1000[1] = 1 // MOP setpoint

It is not possible to directly select the operating mode of the MM440/G120 frequency inverter by pressing the keys on the BOP.

To do this, the frequency inverter has to be parameterized. As already explained, one or two keys simultaneously can be re-parameterized for these purposes. One key or two keys - the same as at the BOP-2 – is/are used to change over (toggle between) the manual/automatic modes.

Possible variants of the frequency inverter parameterization (frequency inverter parameter assignment) are listed in the following.

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2.1 Manual/auto using the "Reversing" key

Automatic mode = CDS1 = "Reversing" key not pressed = „0“

Manual mode = CDS2 = "Reversing" key pressed shortly and released = "1"

Table 2-1 Parameterization of the frequency inverter: Manual/auto using the „Reversing“ key

Parameter No.	Designation	Parameter value	Note / comments
Access level:			
P0003	Access level	3	3: Expert
Command source:			
P0700[0]	Selection of command source, CDS1	2	2: Terminals
P0700[1]	Selection of command source, CDS2	1	1: BOP
Frequency setpoint source:			
P1000[0]	Selection of frequency setpoint, CDS1	2	2: Analog setpoint
P1000[1]	Selection of frequency setpoint, CDS2	1	1: MOP setpoint
CDS changeover:			
P0810	BI: CDS bit 0 (Local/Remote)	r19.b	„Reversing” key
Digital input:			
P0702[0]	Function of digital input 2, CDS1	99	99: Enable BICO parameterization
P0702[1]	Function of digital input 2, CDS2	99	99: Enable BICO parameterization
Deactivating reversing using the BOP:			
P1113[0] *	BI: Reverse, CDS1	0	not active
P1113[1] *	BI: Reverse, CDS2	0	not active

* With this setting, reversing is no longer possible using the "Reversing" key.

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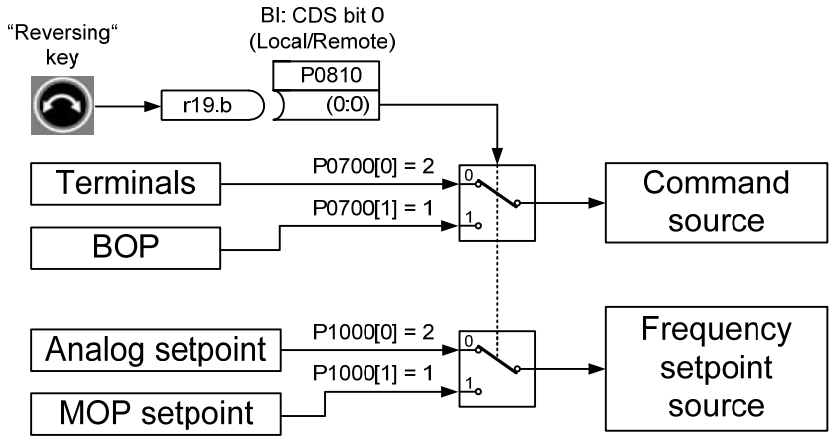

Figure 2-1 Diagram: Manual/auto using the "Reversing" key

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2.2 Manual/Auto using the "JOG" key

Note:

The "1" from the "JOG" key is only generated if the key is kept pressed. The signal is reset to "0" when the key is released. This is the reason that when using the "JOG" key to generate a continuous signal, it is additionally necessary to parameterize the free blocks (FFB) of the frequency inverter.

After parameterizing the logic, the following applies:

Automatic mode = CDS1 = "JOG" key not pressed = "0"

Manual mode = CDS2 = "JOG" key pressed shortly and released = "1"

Table 2-2 Parameterization of the frequency inverter: Manual/auto using the „JOG“ key

Parameter No.	Designation	Parameter value	Note / comments
Access level:			
P0003	Access level	3	3: Expert
Command source:			
P0700[0]	Selection of command source, CDS1	2	2: Terminals
P0700[1]	Selection of command source, CDS2	1	1: BOP
Frequency setpoint source:			
P1000[0]	Selection of frequency setpoint, CDS1	2	2: Analog setpoint
P1000[1]	Selection of frequency setpoint, CDS2	1	1: MOP setpoint
CDS changeover:			
P0810	BI: CDS bit 0 (Local/Remote)	r2841.0	Output of the RS-FF1
Deactivating JOG using the BOP:			
P1055[0] *	BI: Enable JOG right, CDS1	0	not active
P1055[1] *	BI: Enable JOG right, CDS2	0	not active
Parameterize FFBs:			
P2800	Enable FFBs	1	1: Enabled
P2801[0]	Activate FFBs	1	Activate AND1 (Level 1)
P2801[14]	Activate FFBs	1	Activate RS-FF1 (Level 1)
P2802[0]	Activate FFBs	1	Activate Timer 1 (Level 1)

* With this setting, the "JOG" function is no longer possible using the "JOG" key.

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Parameter No.	Designation	Parameter value	Note / comments
P2810[0]	BI: AND 1	r19.8	1st input of the AND1 = „JOG“ key
P2810[1]	BI: AND 1	r2841.0	2nd input of the AND1 = Output of the RS-FF1
P2840[0]	BI: RS-FF 1	r19.8	Set input of the RS-FF1 = „JOG“ key
P2840[1]	BI: RS-FF 1	r2852.0	Reset input of the RS-FF1 = Output of the Timer 1
P2849	BI: Timer 1	r2811.0	Input signal of the Timer 1 = Output of the AND1
P2850	Delay time of timer 1	0.1	Delay time of timer 1 = 0.1s
P2851	Mode timer 1	3	Mode timer 1 = Pulse generator 3 (seconds)

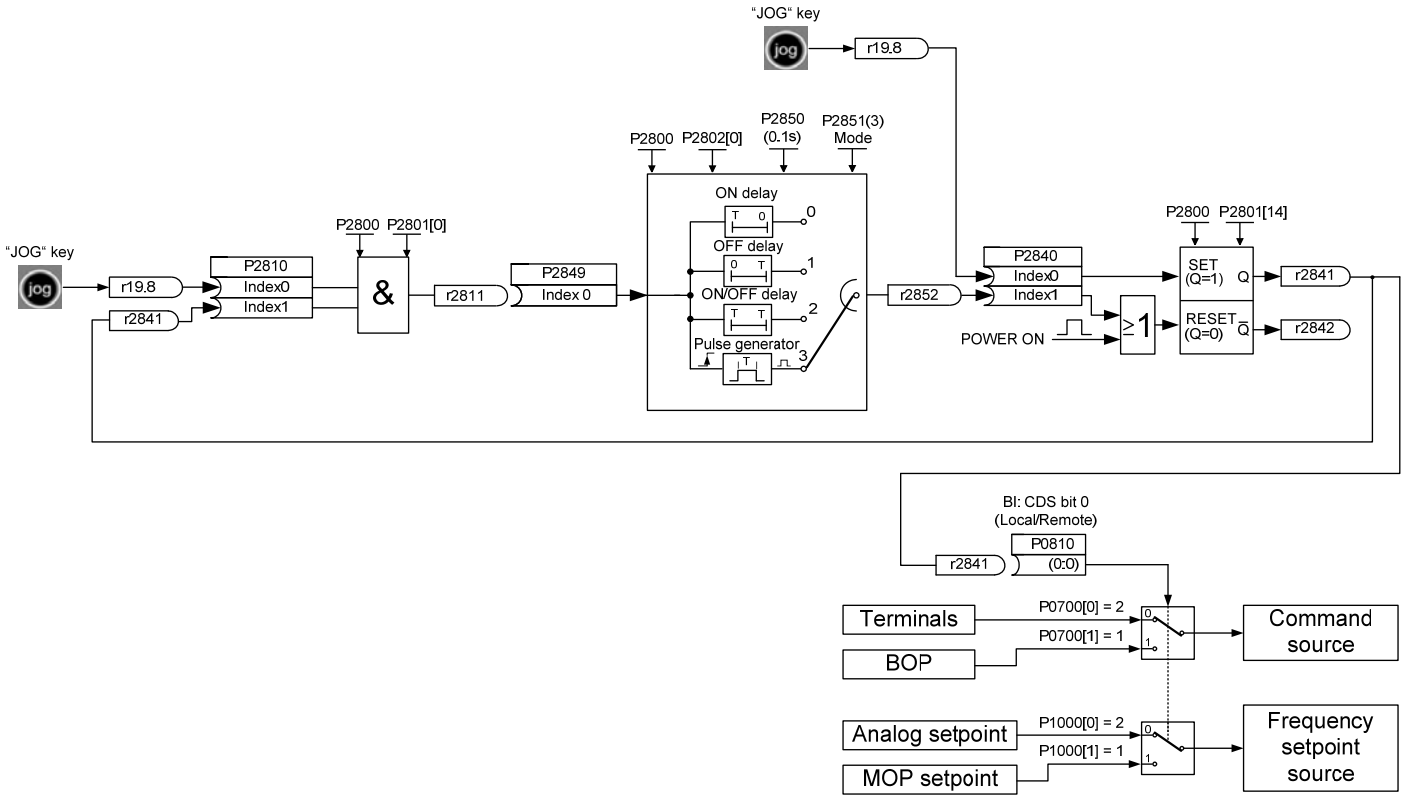

Figure 2-2 Diagram: Manual/auto using the "JOG" key

2.3 Manual/auto using the "Reversing" and "JOG" keys

Note:

In this example, it is also necessary to additionally parameterize the free blocks (FFB) of the frequency inverter.

The manual mode is re-activated alternating by using the "0" and "1" signals from the "Reversing" key. The "JOG" key is used to reset the system to the automatic mode.

After parameterizing the logic, the following applies:

Automatic mode = CDS1 = "JOG" key (pressed shortly and released)

Manual mode = CDS2 = "Reversing key" (pressed shortly and released)

Table 2-3 Parameterization of the frequency inverter: Manual/auto using the "Reversing" and "JOG" keys

Parameter No.	Designation	Parameter value	Note / comments
Access level:			
P0003	Access level	3	3: Expert
Command source:			
P0700[0]	Selection of command source, CDS1	2	2: Terminals
P0700[1]	Selection of command source, CDS2	1	1: BOP
Frequency setpoint source:			
P1000[0]	Selection of frequency setpoint, CDS1	2	2: Analog setpoint
P1000[1]	Selection of frequency setpoint, CDS2	1	1: MOP setpoint
CDS changeover:			
P0810	BI: CDS bit 0 (Local/Remote)	r2817.0	Ausgang des OR1
Deactivating JOG using the BOP:			
P1055[0] *	BI: Enable JOG right, CDS1	0	not active
P1055[1] *	BI: Enable JOG right, CDS2	0	not active
Reversieren mit dem BOP deaktivieren:			
P1113[0] **	BI: Reverse, CDS1	0	not active
P1113[1] **	BI: Reverse, CDS2	0	not active

* With this setting, the "JOG" function is no longer possible using the "JOG" key.
** With this setting, reversing is no longer possible using the "Reversing" key.

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Parameter No.	Designation	Parameter value	Note / comments
Parameterize FFBs:			
P2800	Enable FFBs	1	1: Enabled
P2801[3]	Activate FFBs	1	Activate OR 1 (Level 1)
P2801[9]	Activate FFBs	1	Activate NOT1 (Level 1)
P2801[14]	Activate FFBs	1	Activate RS-FF1 (Level 1)
P2801[15]	Activate FFBs	1	Activate RS-FF2 (Level 1)
P2802[0]	Activate FFBs	1	Activate Timer 1 (Level 1)
P2802[1]	Activate FFBs	1	Activate Timer 2 (Level 1)
P2816[0]	BI: OR 1	r2841.0	1st input of the OR1 = Output of the RS-FF1
P2816[1]	BI: OR 1	r2844.0	2nd input of the OR1 = Output of the RS-FF2
P2828	BI: NOT 1	r19.11	Input of the NOT1 = „Reversing“ key
P2840[0]	BI: RS-FF 1	r2852.0	Set input of the RS-FF1 = Output of the Timer 1
P2840[1]	BI: RS-FF 1	r19.8	Reset input of the RS-FF1 = „JOG“ key
P2843[0]	BI: RS-FF 2	r2857.0	Set input of the RS-FF2 = Output of the Timer 2
P2843[1]	BI: RS-FF 2	r19.8	Reset input of the RS-FF2 = „JOG“ key
P2849	BI: Timer 1	r19.11	Input signal of the Timer 1 = „Reversing“ key
P2850	Delay time of timer 1	0.1	Delay time of timer 1 = 0.1s
P2851	Mode timer 1	3	Mode timer 1 = Pulse generator 3 (seconds)

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Parameter No.	Designation	Parameter value	Note / comments
P2854	BI: Timer 2	r2829.0	Input signal of the Timer 2 = Output of the NOT1
P2855	Delay time of timer 2	0.1	Delay time of timer 2 = 0.1s
P2856	Mode timer 2	3	Mode timer 1 = Pulse generator 3 (seconds)

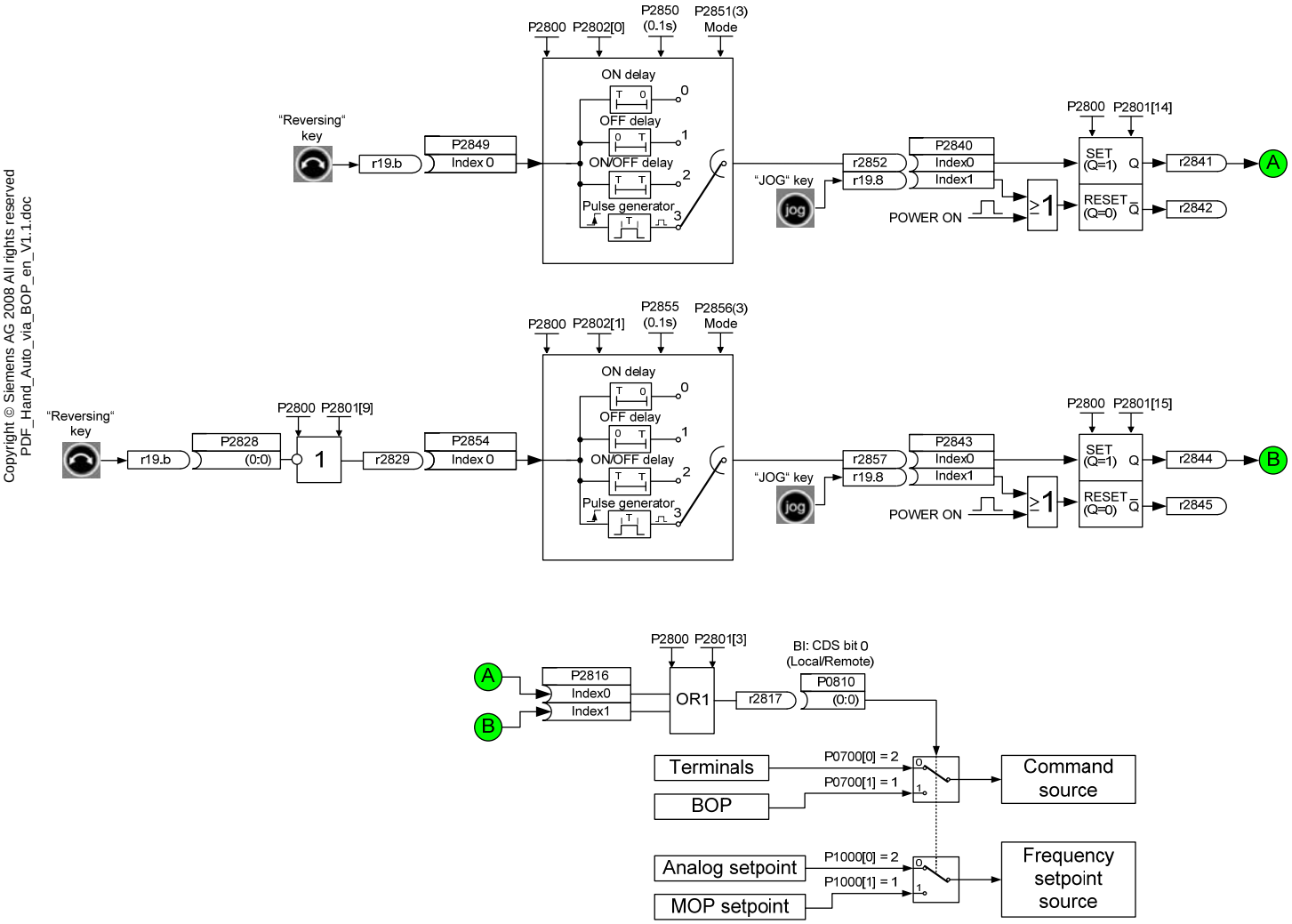

Figure 2-3 Diagram: Manual/auto using the "Reversing" and "JOG" keys

3 Executing scripts in STARTER

For fast parameter changes, you can use the attached script files.

Note:

Before you execute a script on the drive, please set your drive inverter to the factory settings (P0010 = 30, P0970 = 1) and carry-out a quick commissioning (P0010 = 1) of the drive.

The procedure in detail:

1. Save the attached script file in a folder on your computer hard drive.

2. Set-up a script folder for the drive in your STARTER project by clicking with the righthand mouse key on the drive; then click on **“Expert”** (lefthand mouse key) and on **“Insert script folder”**.

   A new folder appears **“SCRIPTS”** at the lower end of the tree.

3. Import the script from your folder into STARTER as described below:
   - Using the righthand mouse key click on the tab **"SCRIPTS"**;
   - Click on **"ASCII import..."** and open the required script file;
   - Assign a name to the opened file and acknowledge with **“OK”**.

4. Go **Online** with the drive.

5. Execute the script by clicking with the righthand mouse key on the script and clicking **“Accept and execute”**;

or open the script by double clicking on it and then pressing the button  **“Accept and execute”**.

Also refer to the application Entry ID: 22078810 "STARTER: Generating application macros" (Chapter 1.5 „Save Expert List and User-defined Lists as Script”, section “Series commissioning of a number of drives using scripts“).

4 Appendix

4.1 Internet links

This list is by no means complete and only provides a selection of appropriate sources.

Table 4-1

	Topic	Title
\1\	Documentation	SINAMICS G120
\2\	Documentation	MICROMASTER 4
\3\	Application	Manual/automatic operation with ramp changeover with one data set
\4\	Application	Tracking the MOP setpoint to another setpoint source to bumplessly changeover the setpoint, for MM4 and G120
\5\	Application	STARTER: Generating application macros

4.2 History

Table 4-2 History

Version	Date	Changes
V1.0	October 2008	First issue
V1.1	October 2008	Diagrams and tables inserted, text revised, script files generated