ProfiBus

User manual

Contents

1 The PROFIBUS kit

ProfiBus is a field bus for SIEMENS equipment. ProfiBus has an international user organization called ProfiBus International, PI, and other local and national organizations. General technical questions regarding the field bus should be addressed to the local ProfiBus User Group for a start.

A contact address list is available on the ProfiBus internet site: http://www.ProfiBus.com .
For general help on ProfiBus, contact ProfiBus International on: ProfiBus_international@compuserve.com .

To connect a CVI controller to the ProfiBus network, it must be equipped with a ProfiBus network kit. The ProfiBus network kits available to date are the following:

Controller type	Kit part number	Number of spindles
CVI II	6159290080	1
TWINCVI II	6159290080	1,2
MODCVI	6159290090	1,2
CPUCVI	6159290100	[1..32]

The ProfiBus kit includes:

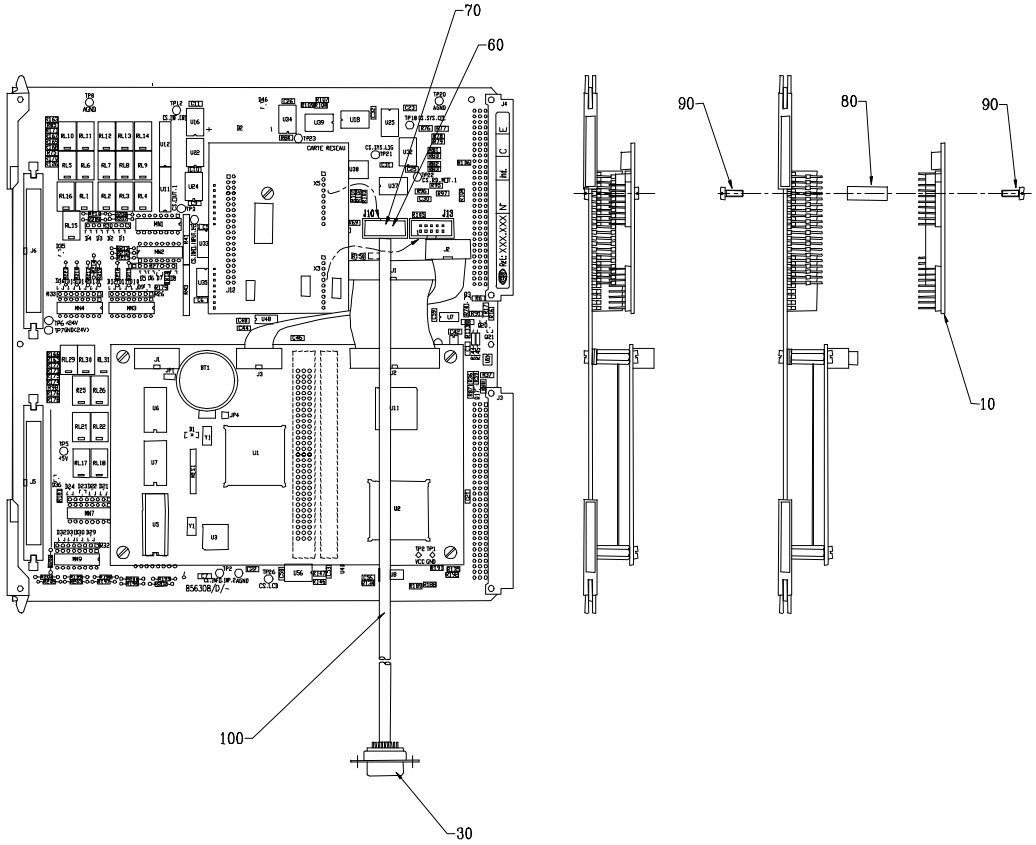
- The ProfiBus electronic kit (COM-DPS board, internal cable, SubD9 connector).
- A CD-ROM including:
- This manual,
- The GSD file (to identify CVI controllers on the ProfiBus network),
- The ZIP file including a STEP7 project example,
- The CVI format programs,
- The CVI range literature.

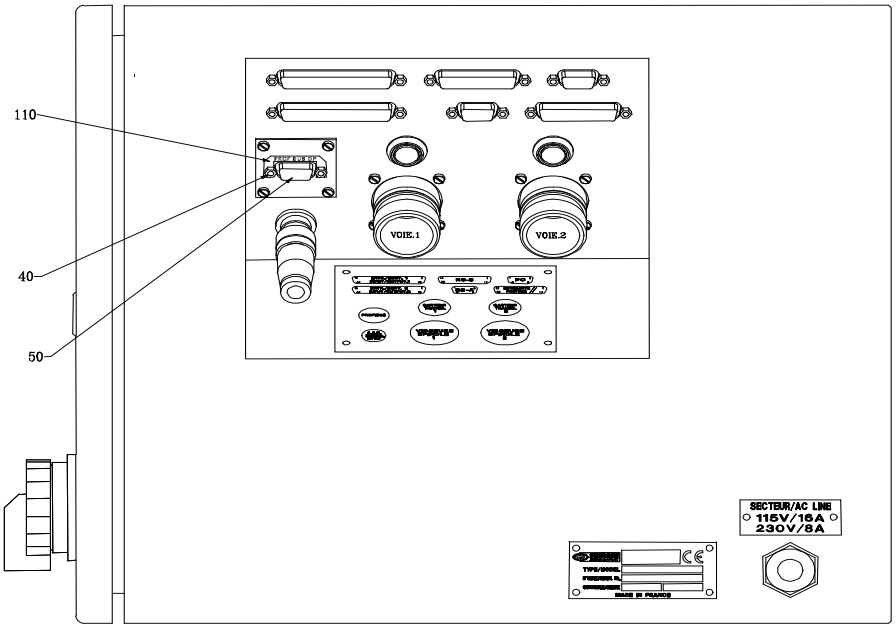
2 Installation

The COM-DPS board is a PROFIBUS-DP slave communication board manufactured by HILSCHER (communication board part number COM-DPS).

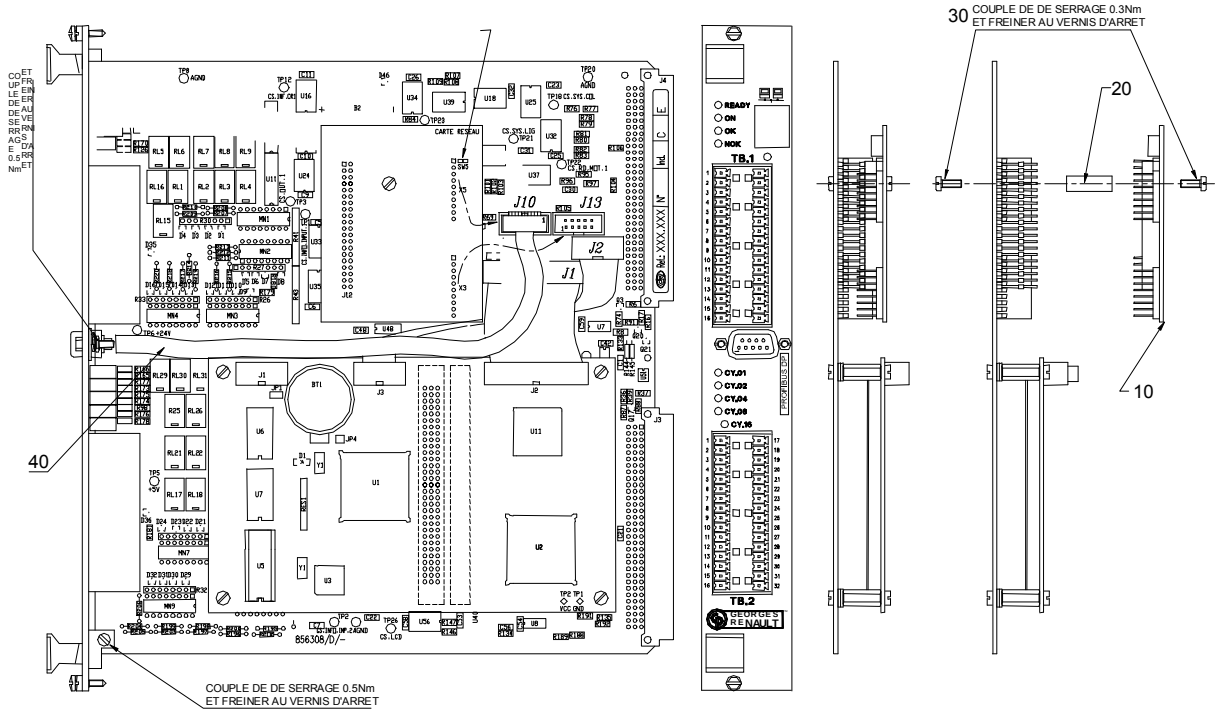
- First remove the input/output board from the controller.
- Then insert the communication board.
- Plug the internal cable onto the communication board.
- After inserting the communication board, plug the input/output sockets onto it.
- Fasten the SUBD9 internal cable connector on the controller.

2.1 TWINCVI II communication board (Ref. 6159290080)

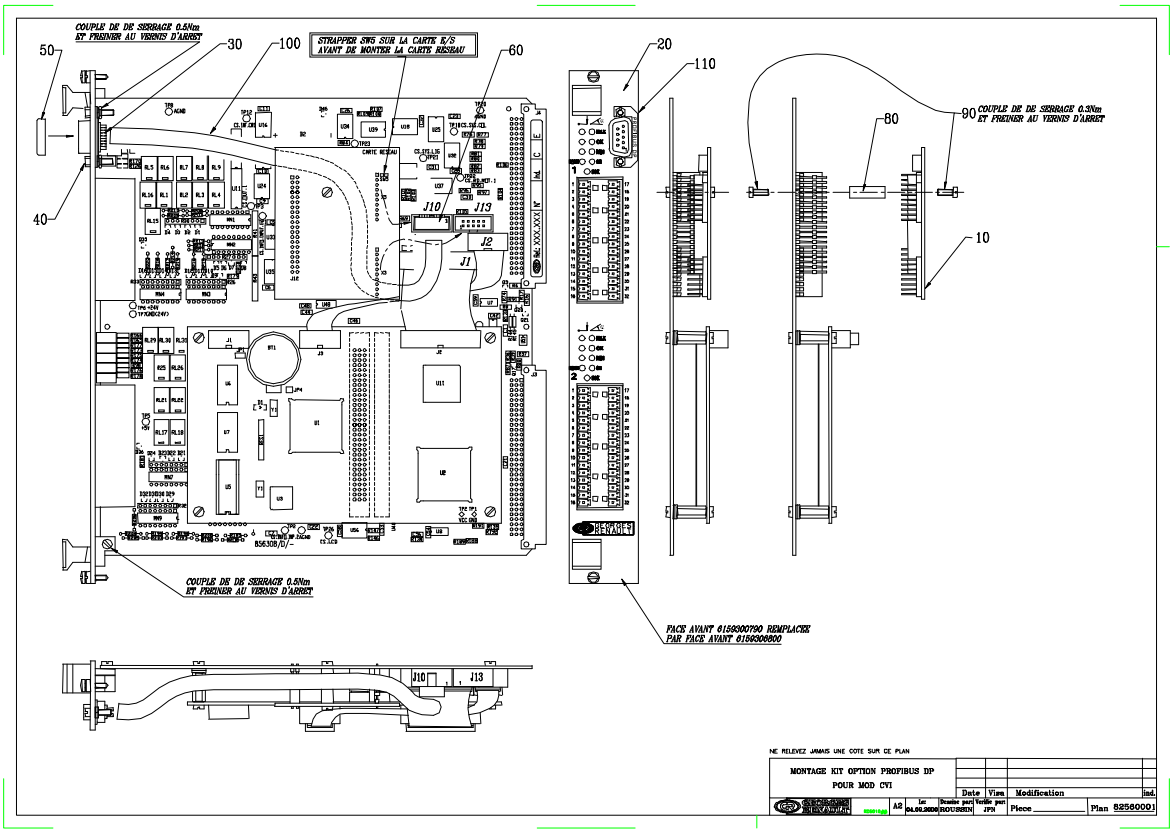




2.2 MODCVI communication board (Ref. 6159290090)

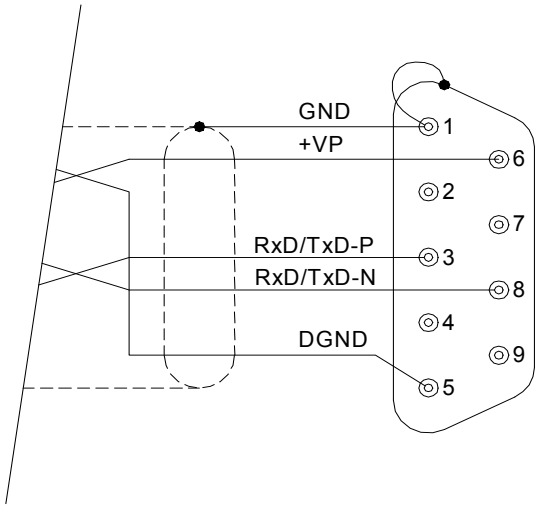


2.3 CPUCVI communication board (Ref. 6159290100)



2.4 The SUBD9 connector

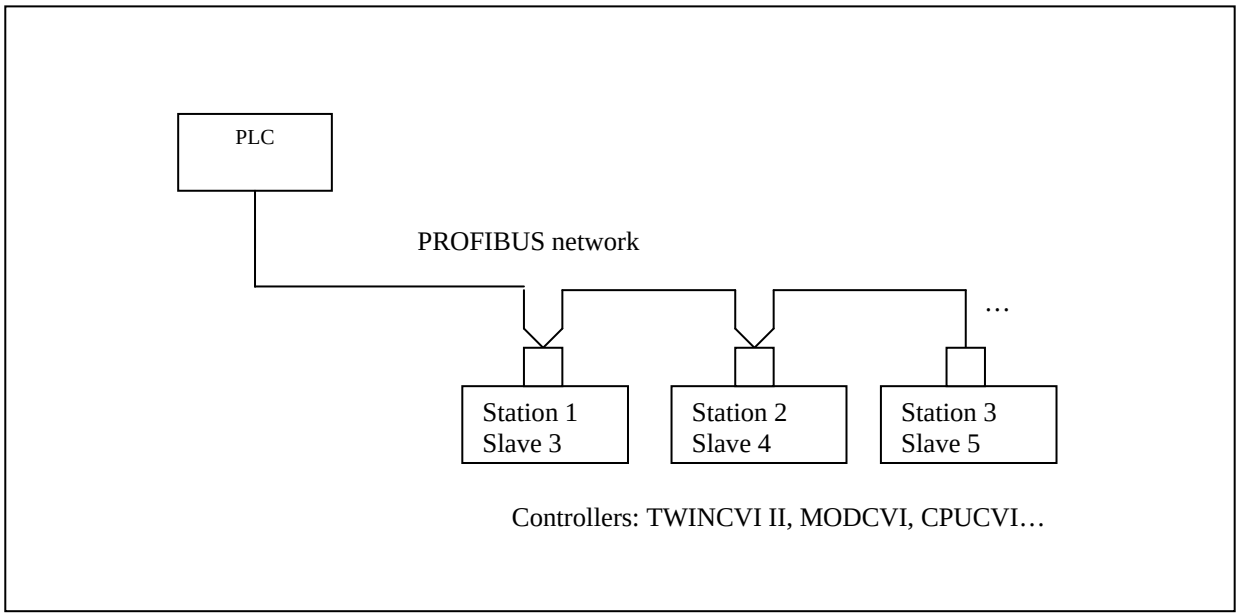
Definition of the tightening controller SUBD9connector on the internal cable:



2.5 Line termination

In a PROFIBUS network, each bus end must have a line termination. There are several methods to have a line termination at each bus end:

- The connector of the last peripheral includes the end-of-line resistor.
- The peripheral can be configured in line termination.
- A passive or an active termination is placed at the end of the line.



3 Configuration

When the hardware is in place, you can install the GSD file, configure the PROFIBUS network and integrate the controllers.

3.1 Installing the GSD file

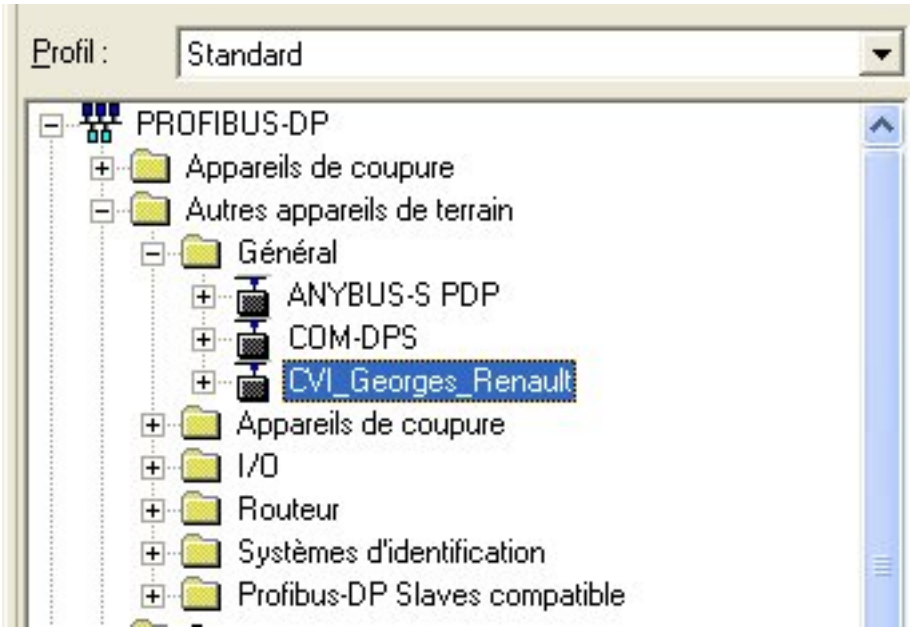
To insert a slave peripheral into a PROFIBUS network, you need the GSD file corresponding to the added slave. Since all tightening controllers are equipped with the same communication module from HILSCHER, the same GSD file “HIL_GR.GSD” can be used for all the tightening controllers.

The GSD file is supplied on the PROFIBUS kit CD-ROM.

STEP7 project example: installing the GSD file

- Run STEP7.
- Go to "Hardware Configuration".
- In the "TOOLS" menu, select "Install new GSD" and follow the instructions.

The GSD file is then placed in the STEP7 catalogue. Its name is CVI_Georges_Renault:



3.2 Configuring the CVI controller and the PLC

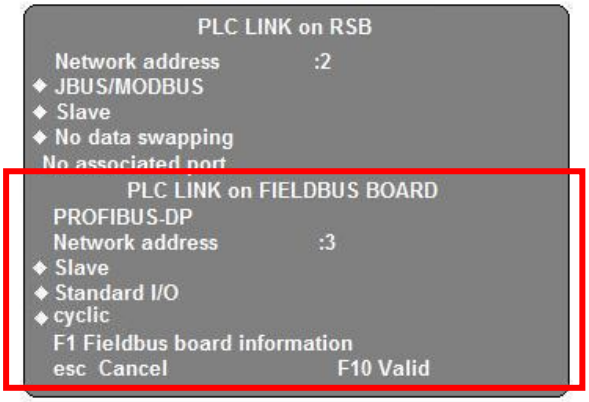
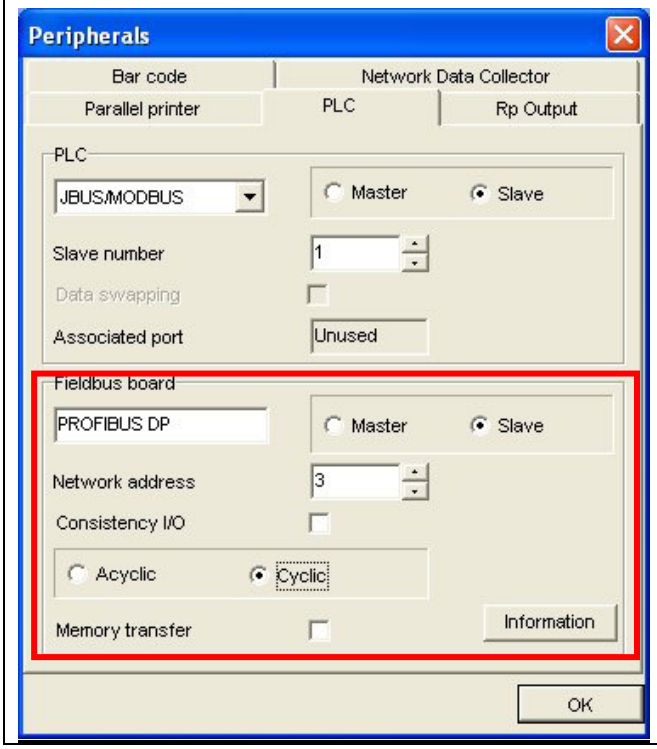
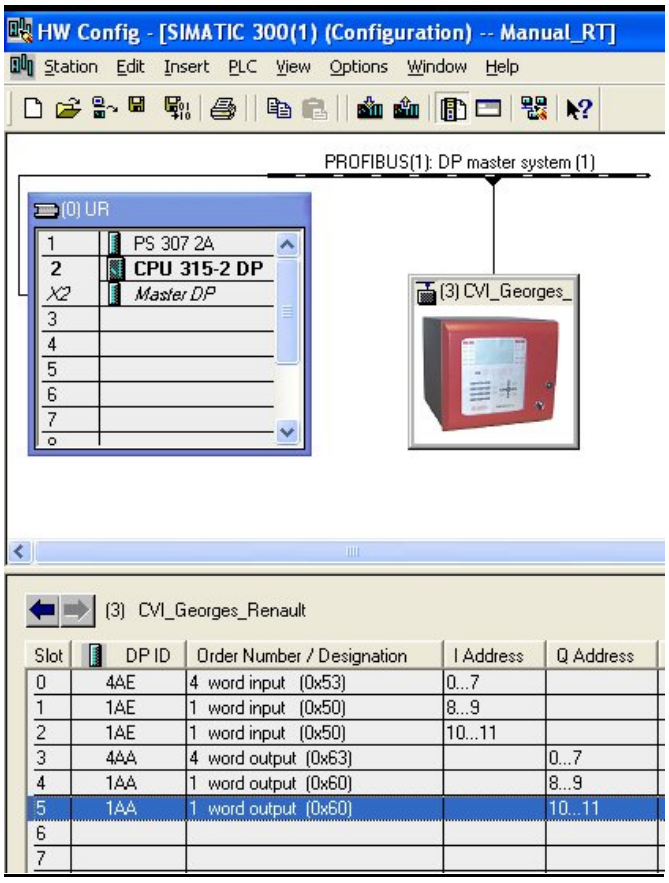
Two configurations (two running modes) are available:

- Digital Input / Output, called “Standard I/O”
- Digital Input / Output and Tightening Result, called “Memory Transfer”

The configuration can be done:

- from the CVI controller keypad, with the keys, or
- from a computer, with the CVIPC2000 software.

3.2.1 Digital Input / Output configuration – “Standard I/O”

CVI	STEP7
Configuring from the CVI keypad:  Configuring with the CVIPC2000 software: 	

On the CVI: change and complete the ProfiBus DP address in accordance with the PLC configuration.
On the PLC: assign wished Inputs and Outputs as described above.

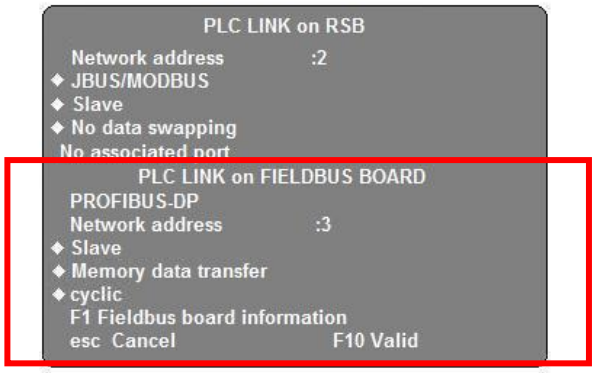
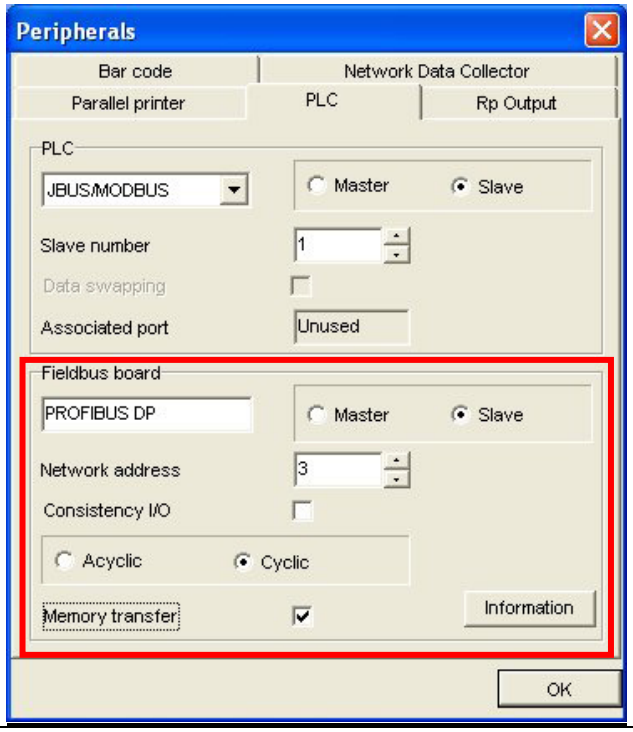
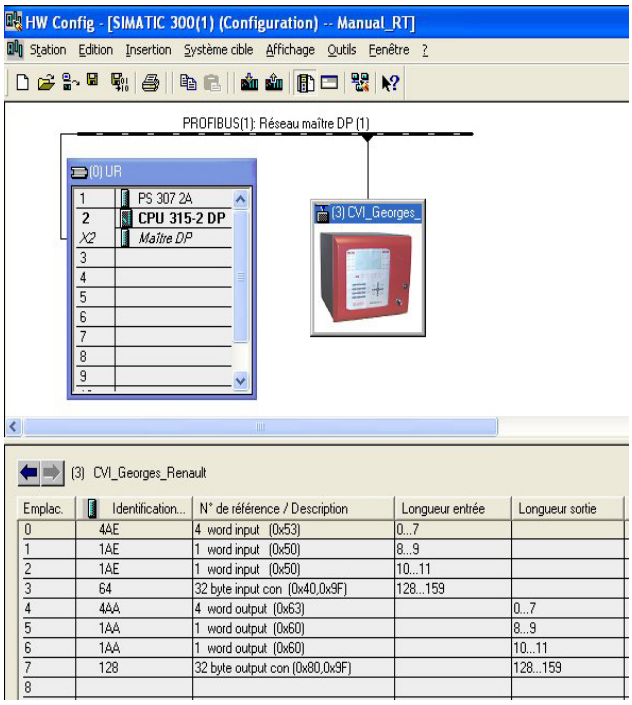
Once the CVI and the PLC have been configured:

- No error should appear on the STEP7 master PLC.
- All the lights on the PLC should be green.

TWIN configuration

“Cycle number selection”: the data is only taken if the “source of cycle number” in the CVI is “PLC”.

3.2.2 Digital Input /Output configuration and Tightening Result – “Memory Transfer”

CVI	STEP7
Configuring from the CVI keypad:  Configuring with the CVIPC2000 software: 	

The configuration is very similar to the “standard I/O” configuration. A 32 byte bloc is added for reading the tightening result.

On the CVI: change and complete the ProfiBus DP address in accordance with the PLC configuration.
On the PLC: assign wished Inputs and Outputs as described above.

Once the CVI and the PLC have been configured:

- No error should appear on the STEP7 master PLC.
- All the lights on the PLC should be green.

Address

For a MODCVI or a MULTICVI, as opposed to the TWINCVI II, the address can only be programmed with the CVIPC2000 software.

TWIN configuration

“Cycle number selection”: the data is only taken if the “source of cycle number” in the CVI is “PLC”.

3.3 Configuring the DPV1

To work in acyclic mode on the slave, the master configuration software must be used to enable the DPV1 extension for each slave. Please contact the Desoutter factory for further information about the DPV1 extension.

3.4 Assigning the Inputs / Outputs

See the CVI User Manual to get a detailed description of each Input and Output.

3.4.1 Digital Input / Output mapping

This mapping is used for the two configurations (“Standard I/O” and “Memory Transfer”).

A CVI controller can be used in asynchronous mode (two stations with one spindle each) or in synchronous mode (one station with one or two spindles). The digital I/O is used to control either of the modes (synchronous or asynchronous). The I/O area of the CVI controller contains:

- 6 Input words
- 6 Output words

Note

The Master DP must be configured with the same mapping.

3.4.1.1 Outputs: Data written by the PLC

See the table for details on the next page.

	Type	Channel	Description	Note	Description	Note	Description	Note
			TWINCVI II ASYNCHRONOUS MODE		**TWINCVI II SYNCHRONOUS MODE**		**CVI II and MULTICVI**	
A0.0	Boolean	Ch. 1	Emergency stop	Not available via ProfiBus	Emergency stop	Not available via ProfiBus	Emergency stop	Not available via ProfiBus
A0.1	Boolean	Ch. 1	Reset		Reset		Reset	
A0.2	Boolean	Ch. 1	Fault acknowledgement		Fault acknowledgement		Fault acknowledgement	
A0.3	Boolean	Ch. 1	Spindle validation		Spindle validation		Spindle validation	
A0.4	Boolean	Ch. 1	Synchro in	Not available via ProfiBus	Synchro in	Not available via ProfiBus	Synchro in	Not available via ProfiBus
A0.5	Boolean	Ch. 1	External stop	Not available via ProfiBus	External stop	Not available via ProfiBus	External stop	Not available via ProfiBus
A0.6	Boolean	Ch. 1	Not used	Not used	Not used	Not used	Not used	Not used
A0.7	Boolean	Ch. 1	Not used	Not used	Not used	Not used	Not used	Not used
A1.0	Boolean	Ch. 1	Cycle 1	Not used (see AW8)	Cycle 1	Not used (see AW8)	Cycle 1	Not used (see AW8)
A1.1	Boolean	Ch. 1	Cycle 2	Not used (see AW8)	Cycle 2	Not used (see AW8)	Cycle 2	Not used (see AW8)
A1.2	Boolean	Ch. 1	Cycle 4	Not used (see AW8)	Cycle 4	Not used (see AW8)	Cycle 4	Not used (see AW8)
A1.3	Boolean	Ch. 1	Cycle 8	Not used (see AW8)	Cycle 8	Not used (see AW8)	Cycle 8	Not used (see AW8)
A1.4	Boolean	Ch. 1	Cycle 16	Not used (see AW8)	Cycle 16	Not used (see AW8)	Cycle 16	Not used (see AW8)
A1.5	Boolean	Ch. 1	Start cycle		Start cycle		Start cycle	
A1.6	Boolean	Ch. 1	Direction of rotation		Direction of rotation		Direction of rotation	
A1.7	Boolean	Ch. 1	Report acknowledgement		Report acknowledgement		Report acknowledgement	
A2.0	Boolean	Ch. 2	Emergency stop	Not available via ProfiBus				
A2.1	Boolean	Ch. 2	Reset					
A2.2	Boolean	Ch. 2	Fault acknowledgement					
A2.3	Boolean	Ch. 2	Spindle validation		Spindle validation			
A2.4	Boolean	Ch. 2	Synchro in	Not available via ProfiBus				
A2.5	Boolean	Ch. 2	External stop	Not available via ProfiBus	External stop	Not available via ProfiBus		
A2.6	Boolean	Ch. 2	Not used	Not used				
A2.7	Boolean	Ch. 2	Not used	Not used				
A3.0	Boolean	Ch. 2	Cycle 1	Not used (see AW10)				
A3.1	Boolean	Ch. 2	Cycle 2	Not used (see AW10)				
A3.2	Boolean	Ch. 2	Cycle 4	Not used (see AW10)				
A3.3	Boolean	Ch. 2	Cycle 8	Not used (see AW10)				
A3.4	Boolean	Ch. 2	Cycle 16	Not used (see AW10)				
A3.5	Boolean	Ch. 2	Start cycle					
A3.6	Boolean	Ch. 2	Direction of rotation					
A3.7	Boolean	Ch. 2	Report acknowledgement					
AW4	Word	Ch. 1	Input mask		Input mask		Input mask	
AW6	Word	Ch. 2	Input mask		Input mask		Input mask	
AW8	Integer	Ch. 1	Cycle (int.)	(*)	Cycle (int.)	(*)	Cycle (int.)	(*)
AW10	Integer	Ch. 2	Cycle (int.)	(*)				

Note: “A” stands for the German “AUS” = OUT

(*) CVI: Source of cycle number = PLC

3.4.1.2 Input masks

The input masks are used to enable or disable the INPUTS.

Example: To allow the START CYCLE by ProfiBus and disable this function by the 24 VDC input, you must write in the INPUT MASK 0x0020 (bit number 5 is ON).

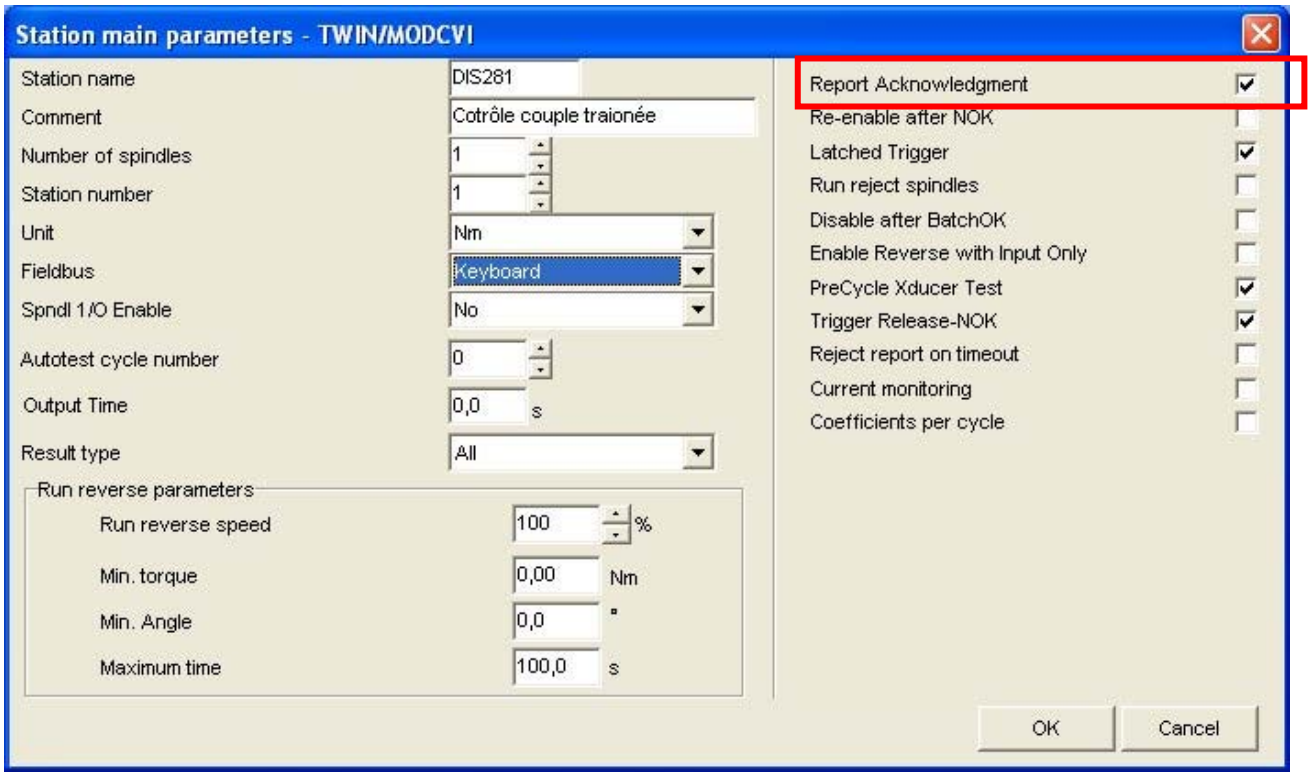
When an input is used both by ProfiBus and by 24 VDC input, you must put "O" (bit number 5 is OFF).In that case an "OR" function links the ProfiBus inputs and the 24VDC input.

The attribution of the outputs to the inputs mask in AW4 and AW5 is mapped as shown in the inputs tables on the following pages.

Report Acknowledgement

If the "Report Acknowledgement" fuction is enabled in the CVI parameters, the controller is waiting for the Input "Request Acknowledgement" is enabled before starting the next tightening. This is a simple way to make sure that the result of the last tightening was read before the next tightening could delete the result.

The “Report Acknowledgement” function can be used only with a CVI version 4.1 or more and a CVIPC2000 version 3.4 or more.



3.4.1.3 Inputs: Data read by the PLC

See the table for details on the two next pages.

	Type	Channel	Description	Note	Description	Note	Description	Note
			TWINCVI II ASYNCHRONOUS MODE		TWINCVI II SYNCHRONOUS MODE		CVI II and MULTICVI	
E0.0	Boolean	Ch. 1	Running		Running		Running	
E0.1	Boolean	Ch. 1	Ready		Ready		Ready	
E0.2	Boolean	Ch. 1						
E0.3	Boolean	Ch. 1						
E0.4	Boolean	Ch. 1	Reset with memory		Reset with memory		Reset with memory	
E0.5	Boolean	Ch. 1	Reset without memory		Reset without memory		Reset without memory	
E0.6	Boolean	Ch. 1	Synchro out		Synchro out		Synchro out	
E0.7	Boolean	Ch. 1						
E1.0	Boolean	Ch. 1	Echo cycle 1		Echo cycle 1		Echo cycle 1	
E1.1	Boolean	Ch. 1	Echo cycle 2		Echo cycle 2		Echo cycle 2	
E1.2	Boolean	Ch. 1	Echo cycle 4		Echo cycle 4		Echo cycle 4	
E1.3	Boolean	Ch. 1	Echo cycle 8		Echo cycle 8		Echo cycle 8	
E1.4	Boolean	Ch. 1	Echo cycle 16		Echo cycle 16		Echo cycle 16	
E1.5	Boolean	Ch. 1	Accept report		Accept report		Accept report	
E1.6	Boolean	Ch. 1	Reject report		Reject report		Reject report	
E1.7	Boolean	Ch. 1	Number of cycles OK		Number of cycles OK		Number of cycles OK	
E2.0	Boolean	Ch. 2	Running		Running		Running	
E2.1	Boolean	Ch. 2	Ready		Ready		Ready	
E2.2	Boolean	Ch. 2						
E2.3	Boolean	Ch. 2						
E2.4	Boolean	Ch. 2	Reset with memory					
E2.5	Boolean	Ch. 2	Reset without memory					
E2.6	Boolean	Ch. 2	Synchro out					
E2.7	Boolean	Ch. 2						
E3.0	Boolean	Ch. 2	Echo cycle 1		Accept spin 1			
E3.1	Boolean	Ch. 2	Echo cycle 2		Accept spin 2			
E3.2	Boolean	Ch. 2	Echo cycle 4		Reject spin 1			
E3.3	Boolean	Ch. 2	Echo cycle 8		Reject spin 2			
E3.4	Boolean	Ch. 2	Echo cycle 16					
E3.5	Boolean	Ch. 2	Accept report					
E3.6	Boolean	Ch. 2	Reject report					
E3.7	Boolean	Ch. 2	Number of cycles OK					

Note: “E” stands for the German “EIN” = IN

	Type	Channel	Description	Note	Description	Note	Description	Note
			TWINCVI II ASYNCHRONOUS MODE		TWINCVI II SYNCHRONOUS MODE		CVI II and MULTICVI	
E4.0	Boolean	Ch. 1	Emergency stop	Echo Emergency stop	Emergency stop	Echo Emergency stop	Emergency stop	Echo Emergency stop
E4.1	Boolean	Ch. 1	Reset	Echo Reset	Reset	Echo Reset	Reset	Echo Reset
E4.2	Boolean	Ch. 1	Acknowledgement	Echo Acknowledgement	Acknowledgement	Echo Acknowledgement	Acknowledgement	Echo Acknowledgement
E4.3	Boolean	Ch. 1	Spindle validation	Echo Spindle validation	Spindle validation	Echo Spindle validation	Spindle validation	Echo Spindle validation
E4.4	Boolean	Ch. 1	Synchro in	Echo Synchro in	Synchro in	Echo Synchro in	Synchro in	Echo Synchro in
E4.5	Boolean	Ch. 1	External stop	Echo External stop	External stop	Echo External stop	External stop	Echo External stop
E4.6	Boolean	Ch. 1						
E4.7	Boolean	Ch. 1						
E5.0	Boolean	Ch. 1	Cycle 1	Echo cycle 1	Cycle 1	Echo cycle 1	Cycle 1	Echo cycle 1
E5.1	Boolean	Ch. 1	Cycle 2	Echo cycle 2	Cycle 2	Echo cycle 2	Cycle 2	Echo cycle 2
E5.2	Boolean	Ch. 1	Cycle 4	Echo cycle 4	Cycle 4	Echo cycle 4	Cycle 4	Echo cycle 4
E5.3	Boolean	Ch. 1	Cycle 8	Echo cycle 8	Cycle 8	Echo cycle 8	Cycle 8	Echo cycle 8
E5.4	Boolean	Ch. 1	Cycle 16	Echo cycle 16	Cycle 16	Echo cycle 16	Cycle 16	Echo cycle 16
E5.5	Boolean	Ch. 1	Start cycle	Echo Spindle running	Start cycle	Echo Spindle running	Start cycle	Echo Spindle running
E5.6	Boolean	Ch. 1	Direction of rotation	Echo Direction	Direction of rotation	Echo Direction	Direction of rotation	Echo Direction
E5.7	Boolean	Ch. 1	Report acknowledgement	Echo Report acknowledgement	Report acknowledgement	Echo Report acknowledgement	Report acknowledgement	Echo Report acknowledgement
E6.0	Boolean	Ch. 2	Emergency stop	Echo Emergency stop				
E6.1	Boolean	Ch. 2	Reset	Echo Reset				
E6.2	Boolean	Ch. 2	Acknowledgement	Echo Acknowledgement				
E6.3	Boolean	Ch. 2	Spindle validation	Echo Spindle validation	Spindle validation	Echo Spindle validation		
E6.4	Boolean	Ch. 2	Synchro in	Echo Synchro in				
E6.5	Boolean	Ch. 2	External stop	Echo External stop	External stop	Echo External stop		
E6.6	Boolean	Ch. 2						
E6.7	Boolean	Ch. 2						
E7.0	Boolean	Ch. 2	Cycle 1	Echo cycle 1				
E7.1	Boolean	Ch. 2	Cycle 2	Echo cycle 2				
E7.2	Boolean	Ch. 2	Cycle 4	Echo cycle 4				
E7.3	Boolean	Ch. 2	Cycle 8	Echo cycle 8				
E7.4	Boolean	Ch. 2	Cycle 16	Echo cycle 16				
E7.5	Boolean	Ch. 2	Start cycle	Echo Spindle running				
E7.6	Boolean	Ch. 2	Direction of rotation	Echo Direction				
E7.7	Boolean	Ch. 2	Report acknowledgement	Echo Report acknowledgement				
EW8	Integer	Ch. 1	Echo Cycle (int.)		Echo Cycle (int.)		Echo Cycle (int.)	
EW10	Integer	Ch. 2	Echo Cycle (int.)					

Note: “E” stands for the German “EIN” = IN

3.4.2 CVI memory – Tightening result

3.4.2.1 Formatting the CVI memory

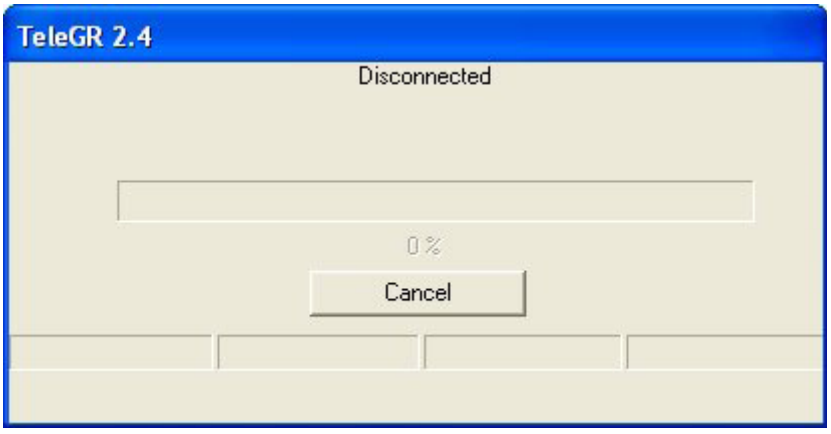
The CVI memory can be formatted to read selected tightening results.

Format	CVI	Type	Tightening strategy
A	Synchronous	ASCII	Torque + Angle
B	Asynchronous	ASCII	Torque + Angle
C	Synchronous	ASCII	Torque + Angle + Rate
D	Asynchronous	ASCII	Torque + Angle + Rate
E	Synchronous	ASCII	Torque tolerance + Angle tolerance
F	Asynchronous	ASCII	Torque tolerance + Angle tolerance
G	Synchronous	ASCII	Torque tolerance + Angle tolerance + Rate tolerance
H	Asynchronous	ASCII	Torque tolerance + Angle tolerance + Rate tolerance
I	Synchronous	Floating	Torque + Angle
J	Asynchronous	Floating	Torque + Angle
K	Synchronous	Floating	Torque + Angle + Rate
L	Asynchronous	Floating	Torque + Angle + Rate
M	Synchronous	Floating	Torque tolerance + Angle tolerance
N	Asynchronous	Floating	Torque tolerance + Angle tolerance
O	Synchronous	Floating	Torque tolerance + Angle tolerance + Rate tolerance
P	Asynchronous	Floating	Torque tolerance + Angle tolerance + Rate tolerance
Q	Synchronous	ASCII	PSA mapping
R	Asynchronous	ASCII	PSA mapping
S	Synchronous	Floating	USK mapping
T	Asynchronous	Floating	USK mapping

Each format is described in detail in APPENDIX B – Formatting the CVI .

The ProfiBus kit CDrom includes the necessary programs to format the CVI memory.

- Go to: \...\formatage_memoire\format_X\ (*).
- Launch the TELEGR.EXE program in the appropriate folder and in the chosen format.
- Connect your PC to the RSPC port of the CVI with an RS232 cable.



- Switch off the CVI.
- Switch the CVI on again.
- The formatting program stored in memory is executed.
- The memory is now formatted in “X” format (*).

(*) “X” stands for the wanted format – see Appendix B

3.4.2.2 The station writing area in the CVI memory

In "memory transfer" mode, the PLC can have access to the tightening results, but also to other aras of the CVI memory.

Station no. 1			Station no. 2						
PROFIBUS DP	PROFIBUS DPV1		PROFIBUS DP	PROFIBUS DPV1					
Address	Slot	Index	Address	Slot	Index	Description	Access	Size	Value
	0x10	0		0x20	0	Cycle number selection	R/W	2	0 - 251
W#16#0202 … W#16#0205	0x11	0	W#16#0402 … W#16#0405	0x21	0	Spindle validation	R/W	4	
W#16#0206	0x12	0	W#16#0406	0x22	0	Length of the bar code	R/W	2	0 - 30
W#16#0208 … W#16#0235	0x13	0	W#16#0408 … W#16#0435	0x23	0	Bar code (written bar code)	R/W	30	

Cycle number selection

This parameter is only taken into account if “Cycle number source” is positioned on “PLC” in the CVI controller.

Spindle validation

This parameter is only taken into account if “Spindle validation” is on “PLC” in the CVI controller. A 32 bit long word describes one spindle per bit:

Byte no.	Spindles
1st byte	Spindles 25 to 32
2nd byte	Spindles 17 to 24
3rd byte	Spindles 9 to 16
3rd byte	Spindles 1 to 8

Bar code

Writing a bar code into the memory can be done:

- to memorize a code in the tightening result for a tightening controller, or
- to select a cycle according to a bar code. To use the code as cycle number, the options must be selected as follows:
  - set “Source cycle no.” to “Bar code”
  - tick “read by the PLC” in the bar code parameters.
  - generate the "Bar code - Cycle number" table with the CVIPC2000 and transfer the table to the CVI.

Note

The PLC must transmit the bar code together with its length, in one and same programming step. When the controller acknowledges the bar code, the length is set to 0 again.

3.4.2.3 The station reading area in the CVI memory

In "memory transfer" mode, the PLC can have access to the tightening results, but also to other aras of the CVI memory.

Station no. 1			Station no. 2						
PROFIBUS DP	PROFIBUS DPV1		PROFIBUS DP	PROFIBUS DPV1					
Address	Slot	Index	Address	Slot	Index	Description	Access	Size	Value
W#16#1002	0x30	0	W#16#2002	0x40	0	Bar code	L	30	
W#16#1020	0x31	0	W#16#2020	0x41	0	List of accepted spindles	L	4	
W#16#1024	0x32	0	W#16#2024	0x42	0	List of rejected spindles	L	4	
W#16#1028	0x33	0	W#16#2028	0x43	0	List of ready spindles	L	4	
W#16#102C	0x34	0	W#16#202C	0x44	0	Number of spindles	L	2	1 - 32
W#16#102E	0x35	0	W#16#202E	0x45	0	Cycle number (echo cycle)	L	2	0 - 250
W#16#1030	0x36	0	W#16#2030	0x46	0	Number of cycles programmed	L	2	0,999
W#16#1032	0x37	0	W#16#2032	0x47	0	Number of cycles executed OK	L	2	0,999
W#16#1034	0x38	0	W#16#2034	0x48	0	Result number	L	2	
W#16#1036	0x39	0	W#16#2036	0x49	0	General Report	L	2	0: - 1: OK 2: NOK

Bar code

The bar code comes:

- from reading a standard bar code connected to the CVI or
- from copying the specific code written by the PLC.

If the code is shorter than the maximum length of 30 characters, the unused memory space is filled up with the character “0” (0x00).

List of spindles

A 32 bit long word describes one spindle per bit:

Byte no.	Spindles
1st byte	Spindles 25 to 32
2nd byte	Spindles 17 to 24
3rd byte	Spindles 9 to 16
3rd byte	Spindles 1 to 8

Result number

“Result number” gives the number of the result. It lies between 0 and 65 535. After reaching the maximum value, it starts at 0 again.

3.5 Programming the cycles

See Appendix C – Cycle programming, for how to write the parameters of a tightening cycle.

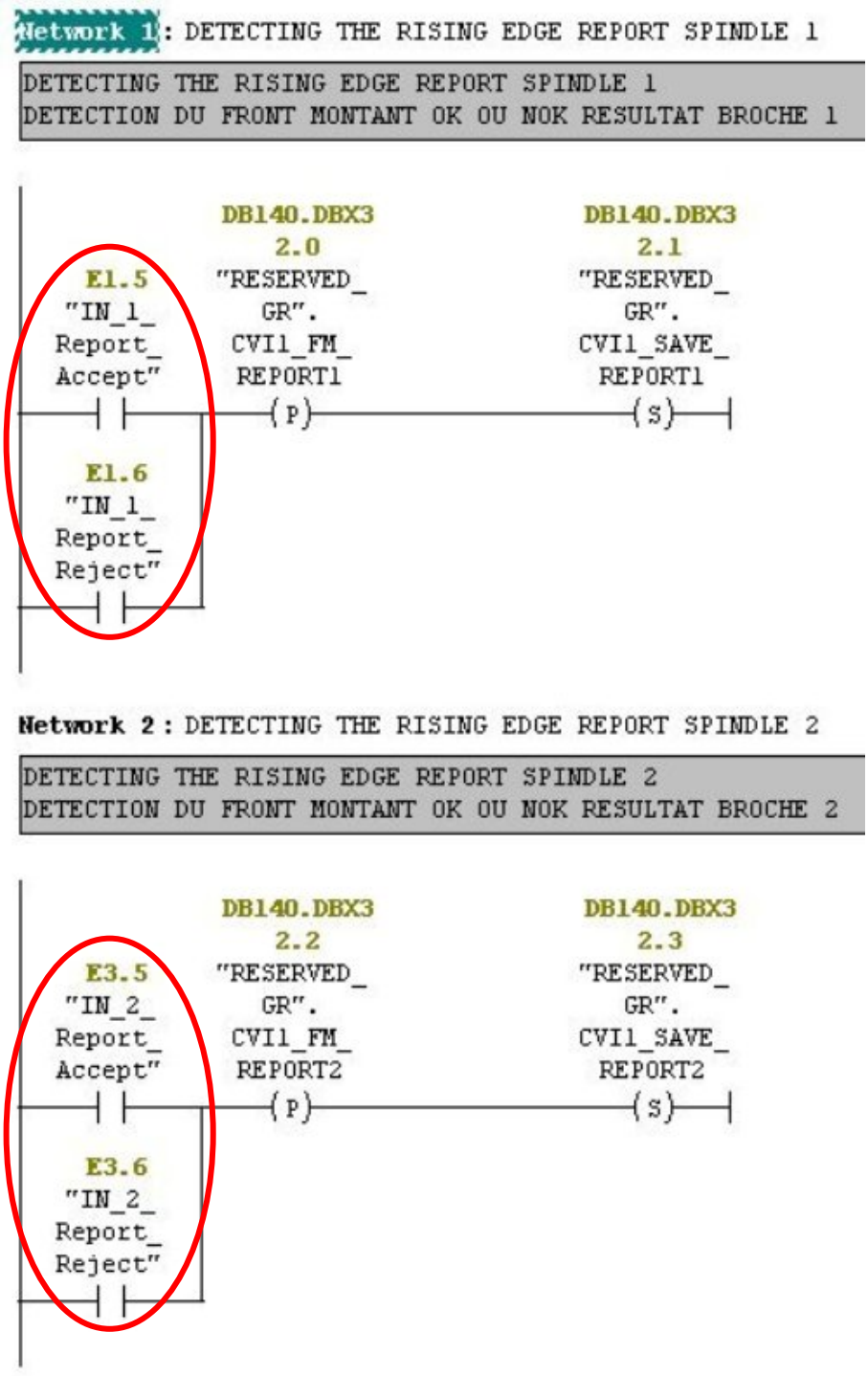
4 STEP7 project example

The STEP7 project example can be executed on the whole STEP7 range in PROFIBUS-DP. It is written in Siemens STEP7 v5.2. The comments are in English.

In the STEP7 project example, the memory of a CVI controller is transferred to a PLC through PROFIBUS. The STEP7 project example can be partly or fully modified to achieve the final project.

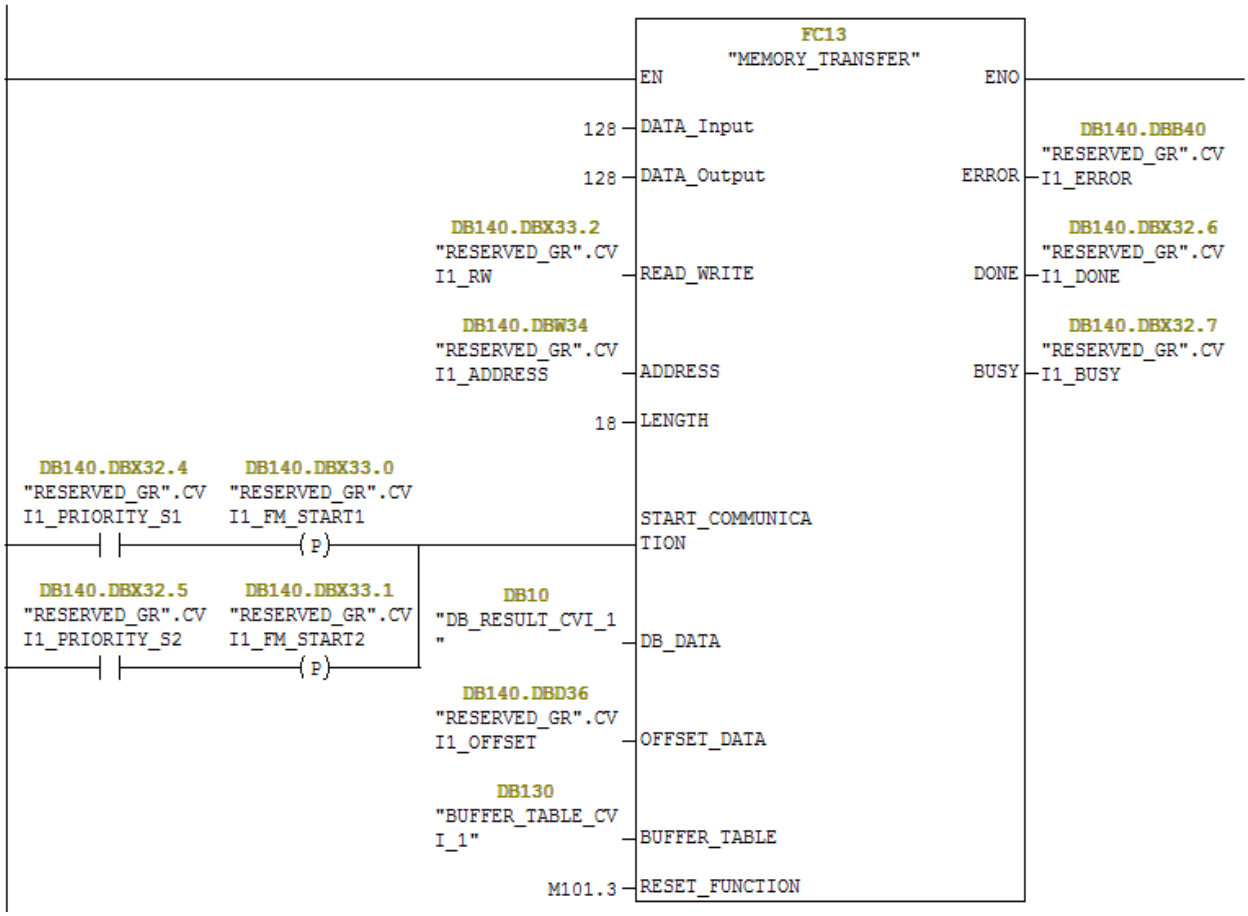
4.1 Digital Input / Output – “Standard I/O”

There is no protocol. The PLC can read or write the CVI controller Inputs / Outputs directly, e.g.:



4.2 Input / Output and tightening results – “Memory Transfer”

The memory transfer from the CVI controller to the PLC or from the PLC to the CVI controller is done with the FC13 function. The FC13 function is described in the STEP7 project example, included in the PROFIBUS kit CD-Rom.



WARNING

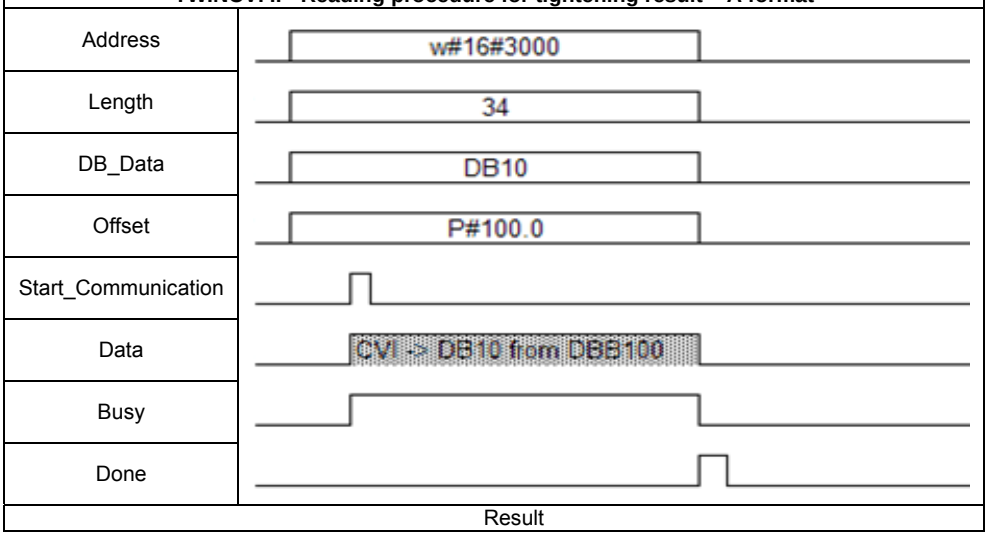
A CVI controller must be controlled by only one FC13 function. It is forbidden to use two or more FC13 functions in the user program to read or write a tightening result of one same CVI.

However, the FC13 function can be renamed or copied at wish for the user program.

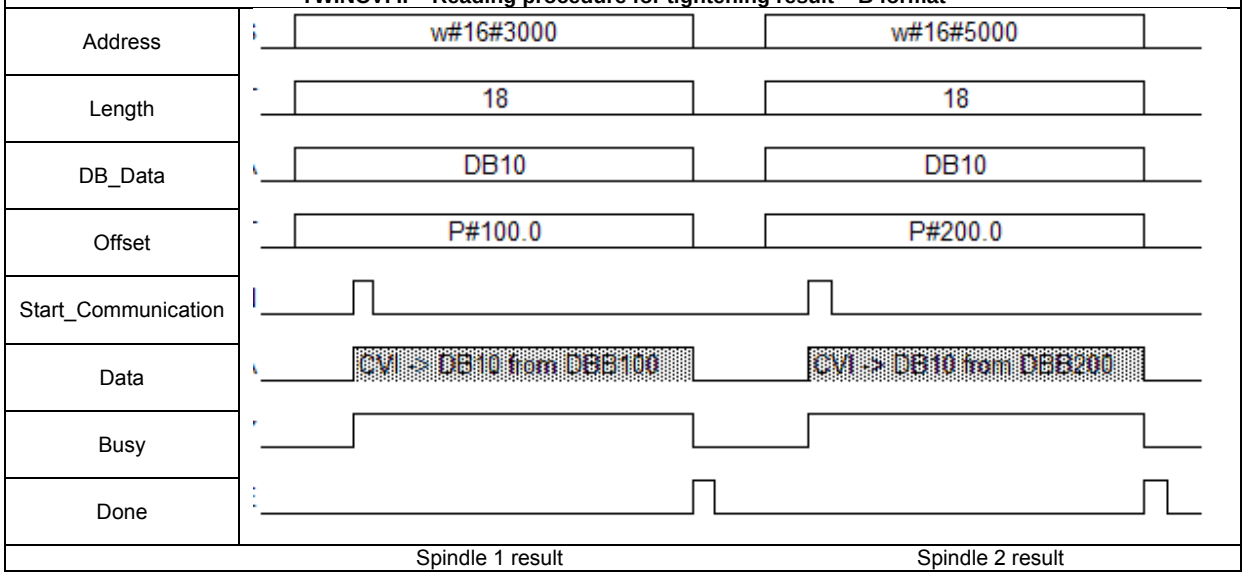
FC13 function inputs	Type	Description
DATA_Input	Integer	Address of the 32 byte Input bloc of the STEP7 hardware configuration.
DATA_Output	Integer	Address of the 32 byte Output bloc of the STEP7 hardware configuration.
READ_WRITE	Boolean	FALSE = Read, TRUE = Write According to whether you want to READ or WRITE.
ADDRESS	Word (W#16#3000)	Address in the CVI controller of the result to READ or WRITE.
LENGTH	Integer	Length of the data to READ or WRITE in the CVI controller
START_COMMUNICATION	Boolean	Starts the communication.
DB_DATA	Block_DB	Data DB number where the data will be written.
OFFSET_DATA	Block_DB	Offset in the data DB where the data will be written.
BUFFER_TABLE	Block_DB	Internal DB number. **This DB must be unique for each CVI controller.**
RESET_FUNCTION	Boolean	Resets the internal data related to the FC13 function.

FC13 function outputs	Type	Description
ERROR	Integer	0 = no error 1 = >32 bytes 2 = Outside of the boundaries 3 = Unknown function 4 = Wrong address 5 = Bad communication
DONE	Boolean	Communication completed
BUSY	Boolean (TRUE=busy)	Communication proceeding

TWINCVI II - Reading procedure for tightening result – A format



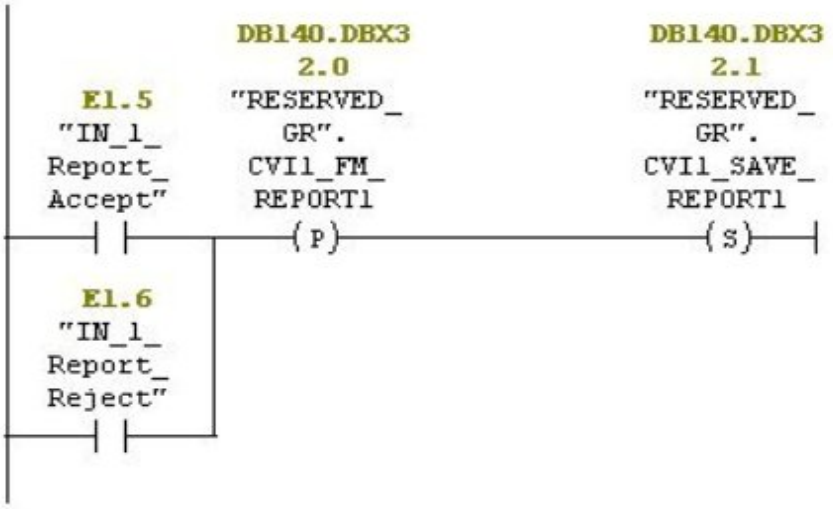
TWINCVI II – Reading procedure for tightening result – B format



Appendix A – Example of STEP7 programming of an asynchronous TWINCVI II

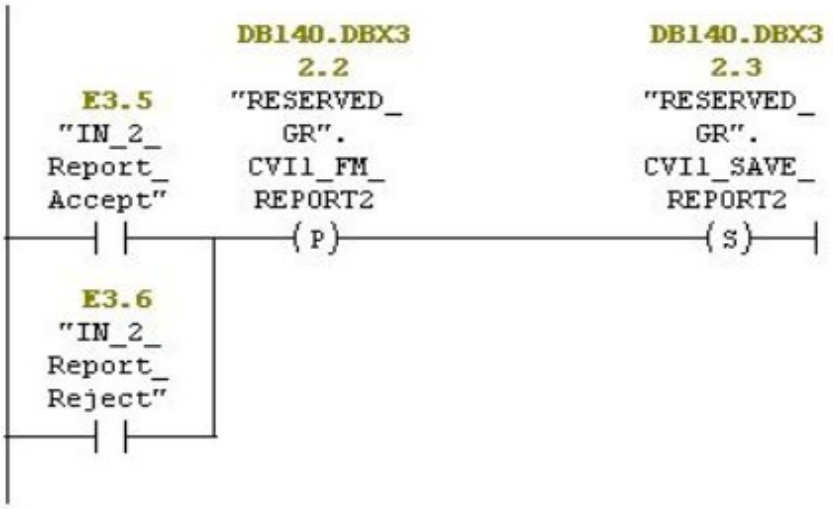
Network 1: DETECTING THE RISING EDGE REPORT SPINDLE 1

DETECTING THE RISING EDGE REPORT SPINDLE 1
DETECTION DU FRONT MONTANT OK OU NOK RESULTAT BROCHE 1



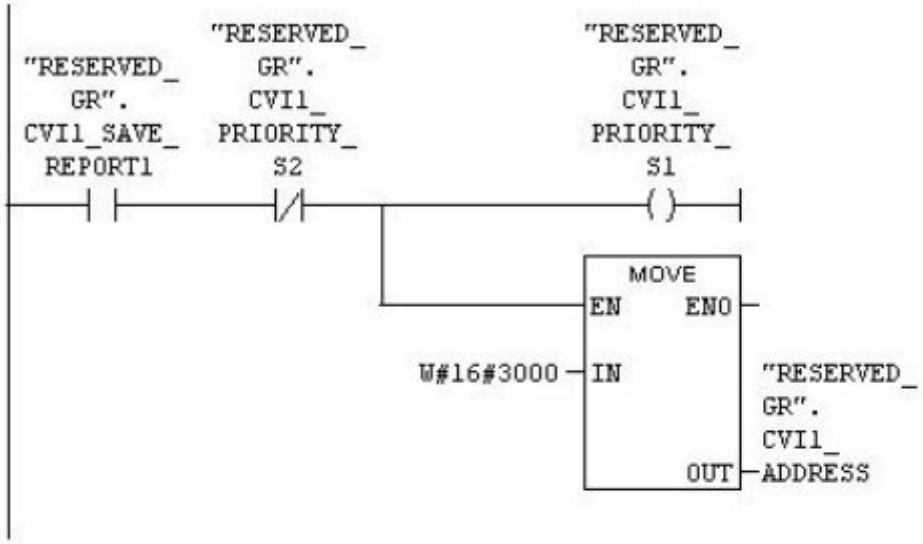
Network 2 : DETECTING THE RISING EDGE REPORT SPINDLE 2

DETECTING THE RISING EDGE REPORT SPINDLE 2
DETECTION DU FRONT MONTANT OK OU NOK RESULTAT BROCHE 2



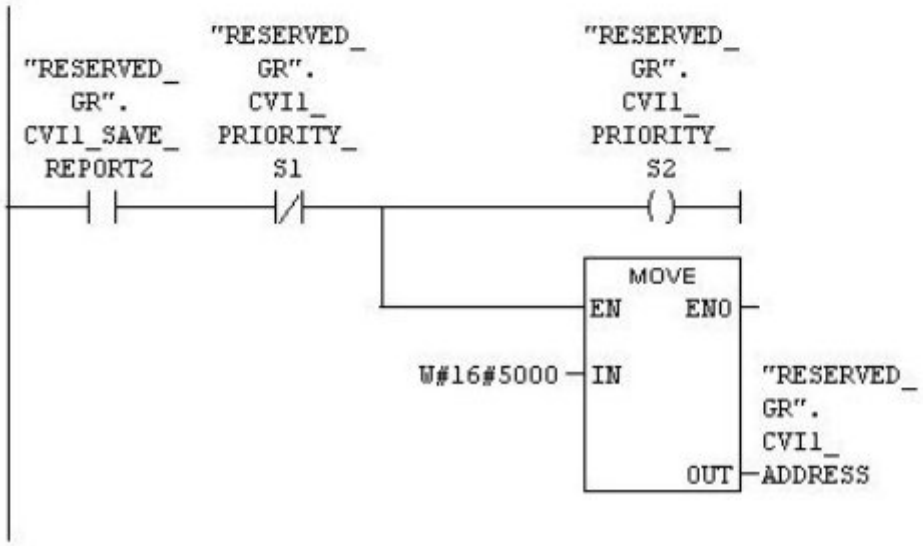
Network 3 : PRIORITY TO SPINDLE 1 IF TWO RESULTS ARRIVE TOGETHER

```
PRIORITY TO SPINDLE 1 IF TWO RESULTS ARRIVE TOGETHER
PRIORITE BROCHE 1 SI DEUX RESULTATS ARRIVENT EN MEME TEMPS
W#16#3000 = ADRESS IN THE CVI 1 FOR SPINDLE 1
W#16#3000 = ADDRESSE DANS LE cvi 1 BROCHE 1
```



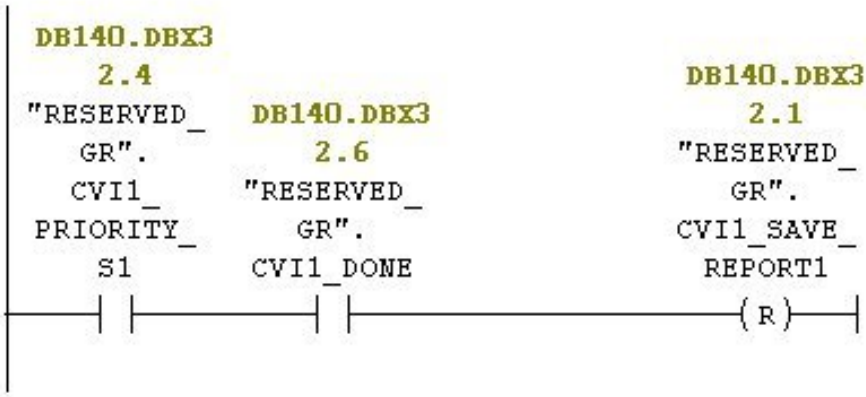
Network 4 : PRIORITY TO SPINDLE 2 IF TWO RESULTS ARRIVE TOGETHER

```
PRIORITY TO SPINDLE 2 IF TWO RESULTS ARRIVE TOGETHER
PRIORITE BROCHE 2 SI DEUX RESULTATS ARRIVENT EN MEME TEMPS
W#16#5000 = ADRESS IN THE CVI 1 FOR SPINDLE 2
W#16#5000 = ADDRESSE DANS LE cvi 1 BROCHE 2
```



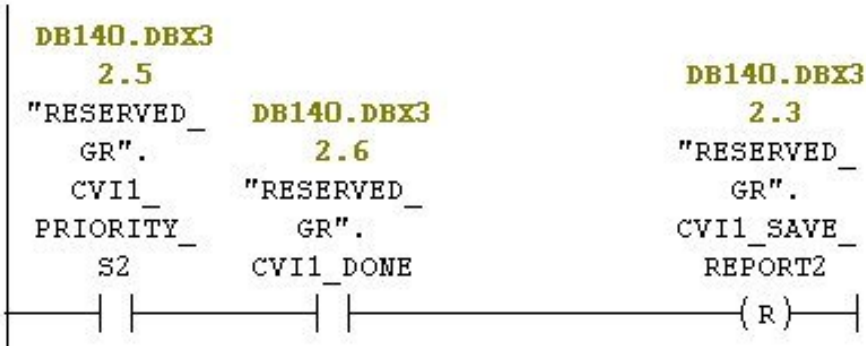
Network 5 : END OF READING RESULT SPINDLE 1 (DONE) RESET THE SAVE BIT

THE BIT IS RESET BY THE BUSY BIT OF THE FUNCTION
LE BIT EST RESETE PAR LE BIT BUSY DE LA FONCTION MEMORY TRANSFER



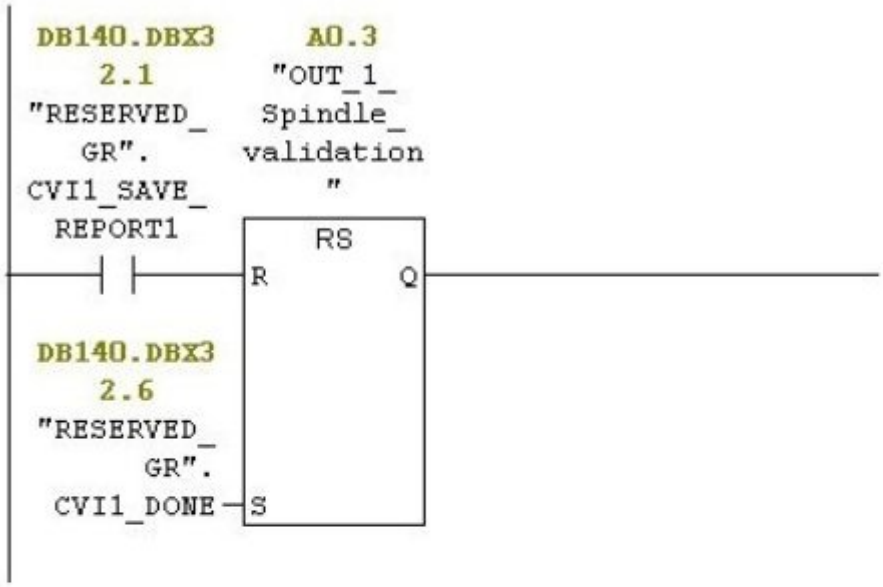
Network 6 : END OF READING RESULT SPINDLE 2 (DONE) RESET THE SAVE BIT

THE BIT IS RESET BY THE BUSY BIT OF THE FUNCTION
LE BIT EST RESETE PAR LE BIT BUSY DE LA FONCTION MEMORY TRANSFER



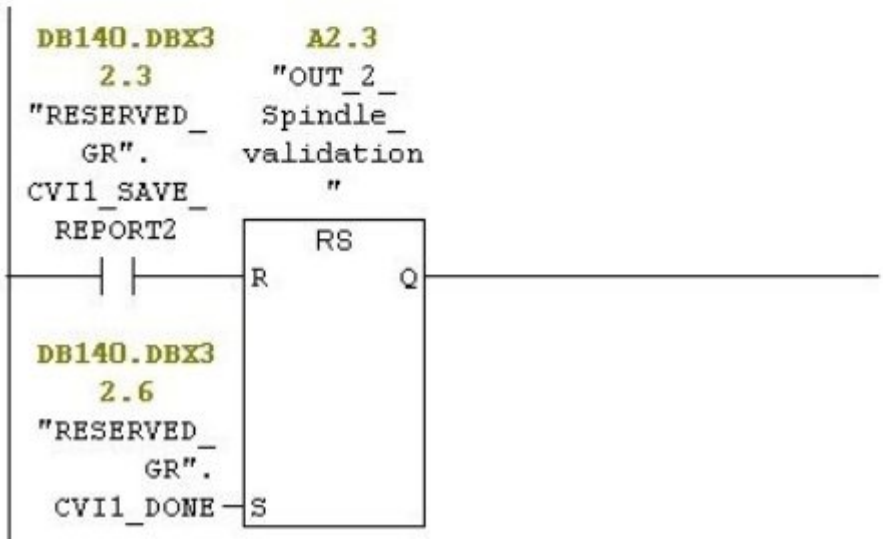
Network 7 : SPINDLE VALIDATION DURING WHILE RESULTS

```
DURING THE COMMUNICATION , THE SPINDLE IS DISABLED
PENDANT LA COMMUNICATION , LA BROCHE EST DEVALIDEE
```



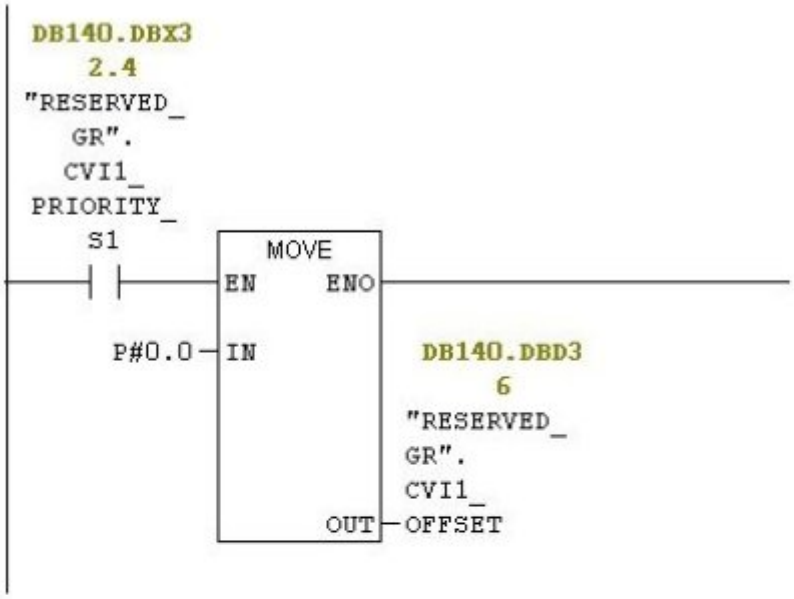
Network 8 : SPINDLE VALIDATION DURING WHILE RESULTS

```
DURING THE COMMUNICATION , THE SPINDLE IS DISABLED.
YOU HAVE TO CONFIGURE THE SPINDLE VALIDATION IN THE CVI (=I/O)
PENDANT LA COMMUNICATION , LA BROCHE EST DEVALIDEE
```



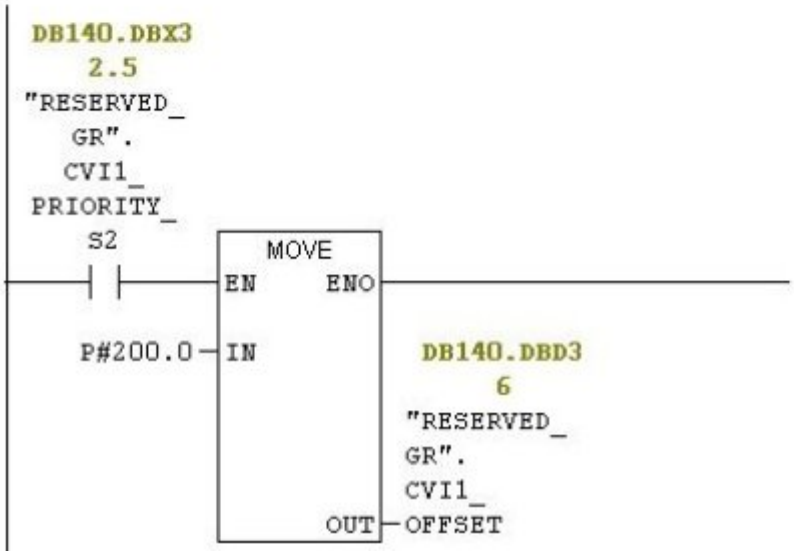
Network 9 : INITIALIZATION OF THE DB RESULTS POINTER

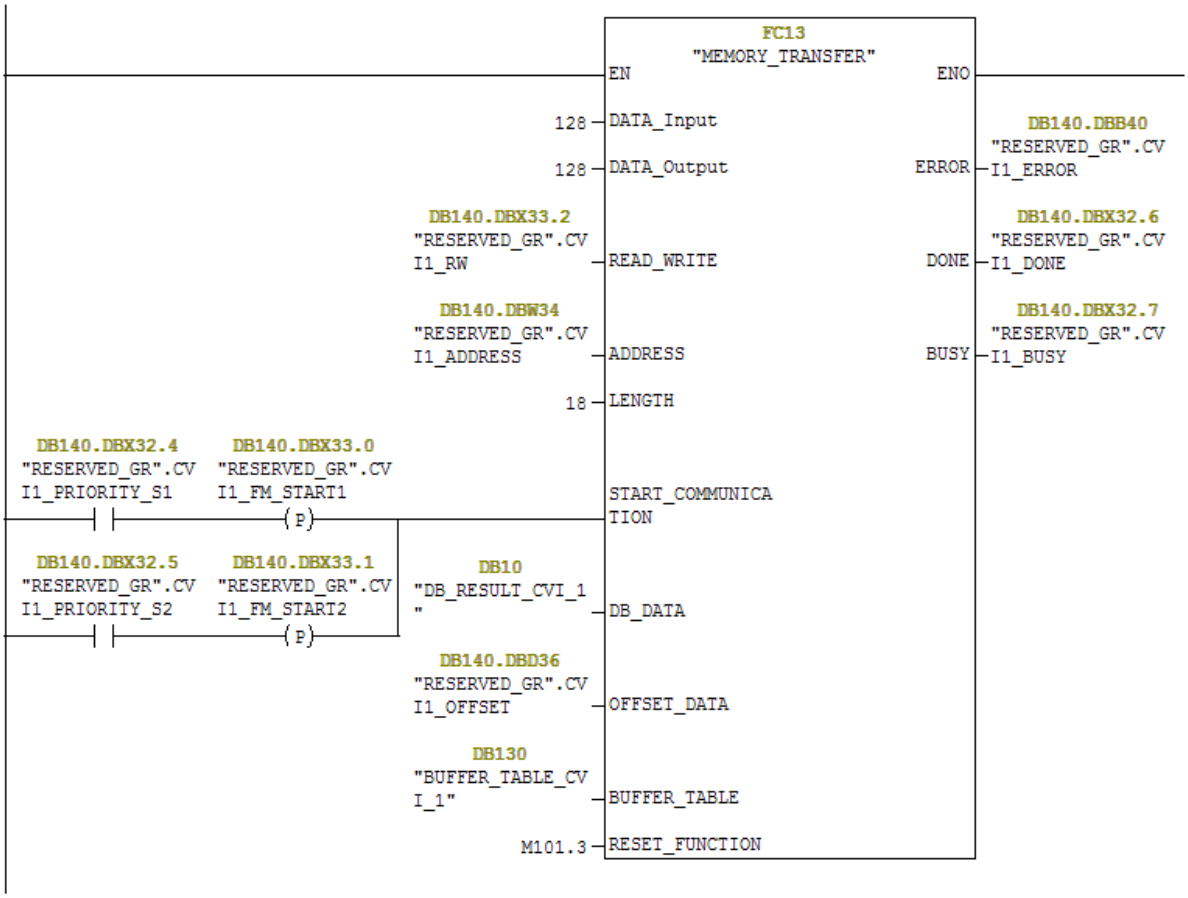
```
INITIALIZATION OF THE POINTER IN THE DB RESULTS
YOU HAVE TO CONFIGURE THE SPINDLE VALIDATION IN THE CVI
THE RESULTS CAN BE SAVED EVERYWHERE IN THE DB WITH THIS POINTER
```



Network 10 : INITIALIZATION OF THE DB RESULTS POINTER

```
INITIALIZATION OF THE POINTER IN THE DB RESULTS
YOU HAVE TO CONFIGURE THE SPINDLE VALIDATION IN THE CVI
THE RESULTS CAN BE SAVED EVERYWHERE IN THE DB WITH THIS POINTER
```




FC13
"MEMORY_TRANSFER"
EN
ENO
128
DATA_Input
128
DATA_Output
ERROR
DB140.DBB40
"RESERVED_GR".CV
I1_ERROR
DB140.DBX33.2
"RESERVED_GR".CV
I1_RW
READ_WRITE
DONE
DB140.DBX32.6
"RESERVED_GR".CV
I1_DONE
DB140.DBW34
"RESERVED_GR".CV
I1_ADDRESS
ADDRESS
BUSY
DB140.DBX32.7
"RESERVED_GR".CV
I1_BUSY
18
LENGTH
DB140.DBX32.4
"RESERVED_GR".CV
I1_PRIORITY_S1
DB140.DBX33.0
"RESERVED_GR".CV
I1_FM_START1
P
START_COMMUNICATION
DB140.DBX32.5
"RESERVED_GR".CV
I1_PRIORITY_S2
DB140.DBX33.1
"RESERVED_GR".CV
I1_FM_START2
P
DB10
"DB_RESULT_CVI_1"
DB_DATA
DB140.DBD36
"RESERVED_GR".CV
I1_OFFSET
OFFSET_DATA
DB130
"BUFFER_TABLE_CVI_1"
BUFFER_TABLE
M101.3
RESET_FUNCTION

APPENDIX B – Formatting the CVI memory

A. FORMAT: ASCII – Torque + Angle – Synchronous CVI

CVI address	ASCII – Torque + Angle Synchronous CVI		
W#16#3000	2 bytes	" "	
W#16#3001		"A" or "R"	Global CVI result
W#16#3002	6 bytes	Torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006			
W#16#3007			
W#16#3008	2 bytes	" "	
W#16#3009		"<" or "=" or ">"	Spindle 1 Torque trend
W#16#300A	6 bytes	Angle	Spindle 1
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E			
W#16#300F			
W#16#3010	2 bytes	" "	
W#16#3011		"<" or "=" or ">"	Spindle 1 Angle trend
W#16#3012	6 bytes	Torque	Spindle 2
W#16#3013			
W#16#3014			
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	2 bytes	" "	
W#16#3019		"<" or "=" or ">"	Spindle 2 Torque trend
W#16#301A	6 bytes	Angle	Spindle 2
W#16#301B			
W#16#301C			
W#16#301D			
W#16#301E			
W#16#301F			
W#16#3020	2 bytes	" "	
W#16#3021		"<" or "=" or ">"	Spindle 2 Angle trend
W#16#3022	X bytes	etc.	etc.

A = Accepted / R = Rejected

B. FORMAT: ASCII – Torque + Angle – Asynchronous CVI

CVI address	ASCII – Torque + Angle Asynchronous CVI		
W#16#3000	2 bytes	" "	
W#16#3001		"A" or "R"	Spindle 1 result
W#16#3002	6 bytes	Torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006			
W#16#3007			
W#16#3008	2 bytes	" "	
W#16#3009		"<" or "=" or ">"	Spindle 1 Torque trend
W#16#300A	6 bytes	Angle	Spindle 1
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E			
W#16#300F			
W#16#3010	2 bytes	" "	
W#16#3011		"<" or "=" or ">"	Spindle 1 Angle trend
W#16#5000	2 bytes	" "	
W#16#5001		"A" or "R"	Spindle 2 result
W#16#5002	6 bytes	Torque	Spindle 2
W#16#5003			
W#16#5004			
W#16#5005			
W#16#5006			
W#16#5007			
W#16#5008	2 bytes	" "	
W#16#5009		"<" or "=" or ">"	Spindle 2 Torque trend
W#16#500A	6 bytes	Angle	Spindle 2
W#16#500B			
W#16#500C			
W#16#500D			
W#16#500E			
W#16#500F			
W#16#5010	2 bytes	" "	
W#16#5011		"<" or "=" or ">"	Spindle 2 Angle trend

A = Accepted / R = Rejected

C. FORMAT: ASCII – Torque + Angle + Rate – Synchronous CVI

CVI address	ASCII – Torque + Angle + Rate Synchronous CVI		
W#16#3000	2 bytes	" "	
W#16#3001		"A" or "R"	Global CVI result
W#16#3002	6 bytes	Torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006			
W#16#3007			
W#16#3008	2 bytes	" "	
W#16#3009		"<" or "=" or ">"	Spindle 1 Torque trend
W#16#300A	6 bytes	Angle	Spindle 1
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E			
W#16#300F			
W#16#3010	2 bytes	" "	
W#16#3011		"<" or "=" or ">"	Spindle 1 Angle trend
W#16#3012	6 bytes	Rate	Spindle 1
W#16#3013			
W#16#3014			
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	2 bytes	" "	
W#16#3019		"<" or "=" or ">"	Spindle 1 Rate trend
W#16#301A	6 bytes	Torque	Spindle 2
W#16#301B			
W#16#301C			
W#16#301D			
W#16#301E			
W#16#301F			
W#16#3020	2 bytes	" "	
W#16#3021		"<" or "=" or ">"	Spindle 2 Torque trend
W#16#3022	6 bytes	Angle	Spindle 2
W#16#3023			
W#16#3024			
W#16#3025			
W#16#3026			
W#16#3027			
W#16#3028	2 bytes	" "	
W#16#3029		"<" or "=" or ">"	Spindle 2 Angle trend
W#16#302A	6 bytes	Rate	Spindle 2
W#16#302B			
W#16#302C			
W#16#302D			
W#16#302E			
W#16#302F			
W#16#3030	2 bytes	" "	
W#16#3031		"<" or "=" or ">"	Spindle 2 Rate trend
W#16#3032	X bytes	etc.	etc.

A = Accepted / R = Rejected

D. FORMAT: ASCII – Torque + Angle + Rate – Asynchronous CVI

CVI address	ASCII – Torque + Angle + Rate Asynchronous CVI		
W#16#3000	2 bytes	" "	
W#16#3001		"A" or "R"	Spindle 1 result
W#16#3002	6 bytes	Torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006			
W#16#3007			
W#16#3008	2 bytes	" "	
W#16#3009		"<" or "=" or ">"	Spindle 1 Torque trend
W#16#300A	6 bytes	Angle	Spindle 1
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E			
W#16#300F			
W#16#3010	2 bytes	" "	
W#16#3011		"<" or "=" or ">"	Spindle 1 Angle trend
W#16#3012	6 bytes	Rate	Spindle 1
W#16#3013			
W#16#3014			
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	2 bytes	" "	
W#16#3019		"<" or "=" or ">"	Spindle 1 Rate trend
W#16#5000	2 bytes	" "	
W#16#5001		"A" or "R"	Spindle 1 result
W#16#5002	6 bytes	Torque	Spindle 2
W#16#5003			
W#16#5004			
W#16#5005			
W#16#5006			
W#16#5007			
W#16#5008	2 bytes	" "	
W#16#5009		"<" or "=" or ">"	Spindle 2 Torque trend
W#16#500A	6 bytes	Angle	Spindle 2
W#16#500B			
W#16#500C			
W#16#500D			
W#16#500E			
W#16#500F			
W#16#5010	2 bytes	" "	
W#16#5011		"<" or "=" or ">"	Spindle 2 Angle trend
W#16#5012	6 bytes	Rate	Spindle 2
W#16#5013			
W#16#5014			
W#16#5015			
W#16#5016			
W#16#5017			
W#16#5018	2 bytes	" "	
W#16#5019		"<" or "=" or ">"	Spindle 2 Rate trend

A = Accepted / R = Rejected

E. FORMAT: ASCII – Torque tolerance + Angle tolerance – Synchronous CVI

E format (1/2)

CVI address	ASCII – Torque tolerance + Angle tolerance Synchronous CVI		
W#16#3000	2 bytes	" "	
W#16#3001		"A" or "R"	Global CVI result
W#16#3002	6 bytes	Min. torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006			
W#16#3007			
W#16#3008	6 bytes	Torque	Spindle 1
W#16#3009			
W#16#300A			
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E	6 bytes	Max torque	Spindle 1
W#16#300F			
W#16#3010			
W#16#3011			
W#16#3012			
W#16#3013			
W#16#3014	2 bytes	" "	
W#16#3015		"<" or "=" or ">"	Spindle 1 Torque trend
W#16#3016	6 bytes	Min. Angle	Spindle 1
W#16#3017			
W#16#3018			
W#16#3019			
W#16#301A			
W#16#301B			
W#16#301C	6 bytes	Angle	Spindle 1
W#16#301D			
W#16#301E			
W#16#301F			
W#16#3020			
W#16#3021			
W#16#3022	6 bytes	Max. Angle	Spindle 1
W#16#3023			
W#16#3024			
W#16#3025			
W#16#3026			
W#16#3027			
W#16#3028	2 bytes	" "	
W#16#3029		"<" or "=" or ">"	Spindle 1 Angle trend

A = Accepted / R = Rejected

E format (2/2)

CVI address	ASCII – Torque tolerance + Angle tolerance Synchronous CVI		
W#16#302A	6 bytes	Min. torque	Spindle 2
W#16#302B			
W#16#302C			
W#16#302D			
W#16#302E			
W#16#302F			
W#16#3030	6 bytes	Torque	Spindle 2
W#16#3031			
W#16#3032			
W#16#3033			
W#16#3034			
W#16#3035			
W#16#3036	6 bytes	Max torque	Spindle 2
W#16#3037			
W#16#3038			
W#16#3039			
W#16#303A			
W#16#303B			
W#16#303C	2 bytes	" "	
W#16#303D		"<" or "=" or ">"	Spindle 2 Torque trend
W#16#303E	6 bytes	Min. Angle	Spindle 2
W#16#303F			
W#16#3040			
W#16#3041			
W#16#3042			
W#16#3043			
W#16#3044	6 bytes	Angle	Spindle 2
W#16#3045			
W#16#3046			
W#16#3047			
W#16#3048			
W#16#3049			
W#16#304A	6 bytes	Max. Angle	Spindle 2
W#16#304B			
W#16#304C			
W#16#304D			
W#16#304E			
W#16#304F			
W#16#3050	2 bytes	" "	
W#16#3051		"<" or "=" or ">"	Spindle 2 Angle trend
W#16#3052	X bytes	etc.	etc.
W#16#3053			

F. FORMAT: ASCII – Torque tolerance + Angle tolerance – Asynchronous CVI

F format (1/2)

CVI address	ASCII – Torque tolerance + Angle tolerance Asynchronous CVI		
W#16#3000	2 bytes	" "	
W#16#3001		"A" or "R"	Global CVI result
W#16#3002	6 bytes	Min. torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006			
W#16#3007			
W#16#3008	6 bytes	Torque	Spindle 1
W#16#3009			
W#16#300A			
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E	6 bytes	Max torque	Spindle 1
W#16#300F			
W#16#3010			
W#16#3011			
W#16#3012			
W#16#3013			
W#16#3014	2 bytes	" "	
W#16#3015		"<" or "=" or ">"	Spindle 1 Torque trend
W#16#3016	6 bytes	Min. Angle	Spindle 1
W#16#3017			
W#16#3018			
W#16#3019			
W#16#301A			
W#16#301B			
W#16#301C	6 bytes	Angle	Spindle 1
W#16#301D			
W#16#301E			
W#16#301F			
W#16#3020			
W#16#3021			
W#16#3022	6 bytes	Max. Angle	Spindle 1
W#16#3023			
W#16#3024			
W#16#3025			
W#16#3026			
W#16#3027			
W#16#3028	2 bytes	" "	
W#16#3029		"<" or "=" or ">"	Spindle 1 Angle trend

A = Accepted / R = Rejected

F format (2/2)

CVI address	ASCII – Torque tolerance + Angle tolerance Asynchronous CVI		
W#16#5000	2 bytes	" "	
W#16#5001		"A" or "R"	Global CVI result
W#16#5002	6 bytes	Min. torque	Spindle 2
W#16#5003			
W#16#5004			
W#16#5005			
W#16#5006			
W#16#5007			
W#16#5008	6 bytes	Torque	Spindle 2
W#16#5009			
W#16#500A			
W#16#500B			
W#16#500C			
W#16#500D			
W#16#500E	6 bytes	Max torque	Spindle 2
W#16#500F			
W#16#5010			
W#16#5011			
W#16#5012			
W#16#5013			
W#16#5014	2 bytes	" "	
W#16#5015		"<" or "=" or ">"	Spindle 2 Torque trend
W#16#5016	6 bytes	Min. Angle	Spindle 2
W#16#5017			
W#16#5018			
W#16#5019			
W#16#501A			
W#16#501B			
W#16#501C	6 bytes	Angle	Spindle 2
W#16#501D			
W#16#501E			
W#16#501F			
W#16#5020			
W#16#5021			
W#16#5022	6 bytes	Max. Angle	Spindle 2
W#16#5023			
W#16#5024			
W#16#5025			
W#16#5026			
W#16#5027			
W#16#5028	2 bytes	" "	
W#16#5029		"<" or "=" or ">"	Spindle 2 Angle trend

A = Accepted / R = Rejected

G. FORMAT: ASCII – Torque tolerance + Angle tolerance + Rate tolerance – Synchronous CVI

G format (1/2)

CVI address	ASCII – Torque tolerance + Angle tolerance + Rate tolerance – Synchronous CVI		
W#16#3000	2 bytes	" "	
W#16#3001		"A" or "R"	Global CVI result
W#16#3002	6 bytes	Min. torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006			
W#16#3007			
W#16#3008	6 bytes	Torque	Spindle 1
W#16#3009			
W#16#300A			
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E	6 bytes	Max torque	Spindle 1
W#16#300F			
W#16#3010			
W#16#3011			
W#16#3012			
W#16#3013			
W#16#3014	2 bytes	" "	
W#16#3015		"<" or "=" or ">"	Spindle 1 Torque trend
W#16#3016	6 bytes	Min. Angle	Spindle 1
W#16#3017			
W#16#3018			
W#16#3019			
W#16#301A			
W#16#301B			
W#16#301C	6 bytes	Angle	Spindle 1
W#16#301D			
W#16#301E			
W#16#301F			
W#16#3020			
W#16#3021			
W#16#3022	6 bytes	Max. Angle	Spindle 1
W#16#3023			
W#16#3024			
W#16#3025			
W#16#3026			
W#16#3027			
W#16#3028	2 bytes	" "	
W#16#3029		"<" or "=" or ">"	Spindle 1 Angle trend
W#16#302A	6 bytes	Min. Rate	Spindle 1
W#16#302B			
W#16#302C			
W#16#302D			
W#16#302E			
W#16#302F			
W#16#3030	6 bytes	Rate	Spindle 1
W#16#3031			
W#16#3032			
W#16#3033			
W#16#3034			
W#16#3035			
W#16#3036	6 bytes	Max. Rate	Spindle 1
W#16#3037			
W#16#3038			
W#16#3039			
W#16#303A			
W#16#303B			
W#16#303C	2 bytes	" "	
W#16#303D		"<" or "=" or ">"	Spindle 1 Rate trend

G format (2/2)

CVI address	ASCII – Torque tolerance + Angle tolerance + Rate tolerance Synchronous CVI		
W#16#303E	6 bytes	Min. torque	Spindle 2
W#16#303F			
W#16#3040			
W#16#3041			
W#16#3042			
W#16#3043			
W#16#3044	6 bytes	Torque	Spindle 2
W#16#3045			
W#16#3046			
W#16#3047			
W#16#3048			
W#16#3049			
W#16#304A	6 bytes	Max torque	Spindle 2
W#16#304B			
W#16#304C			
W#16#304D			
W#16#304E			
W#16#304F			
W#16#3050	2 bytes	" "	
W#16#3051		"<" or "=" or ">"	Spindle 2 Torque trend
W#16#3052	6 bytes	Min. Angle	Spindle 2
W#16#3053			
W#16#3054			
W#16#3055			
W#16#3056			
W#16#3057			
W#16#3058	6 bytes	Angle	Spindle 2
W#16#3059			
W#16#305A			
W#16#305B			
W#16#305C			
W#16#305D			
W#16#305E	6 bytes	Max. Angle	Spindle 2
W#16#305F			
W#16#3050			
W#16#3051			
W#16#3052			
W#16#3053			
W#16#3054	2 bytes	" "	
W#16#3055		"<" or "=" or ">"	Spindle 2 Angle trend
W#16#3056	6 bytes	Min. Rate	Spindle 2
W#16#3057			
W#16#3058			
W#16#3059			
W#16#305A			
W#16#305B			
W#16#305C	6 bytes	Rate	Spindle 2
W#16#305D			
W#16#305E			
W#16#305F			
W#16#3050			
W#16#3051			
W#16#3052	6 bytes	Max. Rate	Spindle 2
W#16#3053			
W#16#3054			
W#16#3055			
W#16#3056			
W#16#3057			
W#16#3058	2 bytes	" "	
W#16#3059		"<" or "=" or ">"	Spindle 2 Rate trend
W#16#305A	X bytes	etc.	etc.

A = Accepted / R = Rejected

H. FORMAT: ASCII – Torque tolerance + Angle tolerance + Rate tolerance – Asynchronous CVI

H format (1/2)

CVI address	ASCII – Torque tolerance + Angle tolerance + Rate tolerance – Asynchronous CVI		
W#16#3000	2 bytes	" "	
W#16#3001		"A" or "R"	Global CVI result
W#16#3002	6 bytes	Min. torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006			
W#16#3007			
W#16#3008	6 bytes	Torque	Spindle 1
W#16#3009			
W#16#300A			
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E	6 bytes	Max torque	Spindle 1
W#16#300F			
W#16#3010			
W#16#3011			
W#16#3012			
W#16#3013			
W#16#3014	2 bytes	" "	
W#16#3015		"<" or "=" or ">"	Spindle 1 Torque trend
W#16#3016	6 bytes	Min. Angle	Spindle 1
W#16#3017			
W#16#3018			
W#16#3019			
W#16#301A			
W#16#301B			
W#16#301C	6 bytes	Angle	Spindle 1
W#16#301D			
W#16#301E			
W#16#301F			
W#16#3020			
W#16#3021			
W#16#3022	6 bytes	Max. Angle	Spindle 1
W#16#3023			
W#16#3024			
W#16#3025			
W#16#3026			
W#16#3027			
W#16#3028	2 bytes	" "	
W#16#3029		"<" or "=" or ">"	Spindle 1 Angle trend
W#16#302A	6 bytes	Min. Rate	Spindle 1
W#16#302B			
W#16#302C			
W#16#302D			
W#16#302E			
W#16#302F			
W#16#3030	6 bytes	Rate	Spindle 1
W#16#3031			
W#16#3032			
W#16#3033			
W#16#3034			
W#16#3035			
W#16#3036	6 bytes	Max. Rate	Spindle 1
W#16#3037			
W#16#3038			
W#16#3039			
W#16#303A			
W#16#303B			
W#16#303C	2 bytes	" "	
W#16#303D		"<" or "=" or ">"	Spindle 1 Rate trend

H format (2/2)

CVI address	ASCII – Torque tolerance + Angle tolerance + Rate tolerance Asynchronous CVI		
W#16#5000	2 bytes	" "	
W#16#5001		"A" or "R"	Global CVI result
W#16#5002	6 bytes	Min. torque	Spindle 2
W#16#5003			
W#16#5004			
W#16#5005			
W#16#5006			
W#16#5007			
W#16#5008	6 bytes	Torque	Spindle 2
W#16#5009			
W#16#500A			
W#16#500B			
W#16#500C			
W#16#500D			
W#16#500E	6 bytes	Max torque	Spindle 2
W#16#500F			
W#16#5010			
W#16#5011			
W#16#5012			
W#16#5013			
W#16#5014	2 bytes	" "	
W#16#5015		"<" or "=" or ">"	Spindle 2 Torque trend
W#16#5016	6 bytes	Min. Angle	Spindle 2
W#16#5017			
W#16#5018			
W#16#5019			
W#16#501A			
W#16#501B			
W#16#501C	6 bytes	Angle	Spindle 2
W#16#501D			
W#16#501E			
W#16#501F			
W#16#5020			
W#16#5021			
W#16#5022	6 bytes	Max. Angle	Spindle 2
W#16#5023			
W#16#5024			
W#16#5025			
W#16#5026			
W#16#5027			
W#16#5028	2 bytes	" "	
W#16#5029		"<" or "=" or ">"	Spindle 2 Angle trend
W#16#502A	6 bytes	Min. Rate	Spindle 2
W#16#502B			
W#16#502C			
W#16#502D			
W#16#502E			
W#16#502F			
W#16#5050	6 bytes	Rate	Spindle 2
W#16#5031			
W#16#5032			
W#16#5033			
W#16#5034			
W#16#5035			
W#16#5036	6 bytes	Max. Rate	Spindle 2
W#16#5037			
W#16#5038			
W#16#5039			
W#16#503A			
W#16#503B			
W#16#503C	2 bytes	" "	
W#16#503D		"<" or "=" or ">"	Spindle 2 Rate trend

A = Accepted / R = Rejected

I. FORMAT: Floating – Torque + Angle – Synchronous CVI

CVI address	Floating – Torque + Angle Synchronous CVI		
W#16#3000	2 bytes	0	
W#16#3001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#3002	4 bytes	Torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006	2 bytes	0	
W#16#3007		1,2,3	Spindle 1 Torque trend (*)
W#16#3008	4 bytes	Angle	Spindle 1
W#16#3009			
W#16#300A			
W#16#300B			
W#16#300C	2 bytes	0	
W#16#300D		1,2,3	Spindle 1 Angle trend (*)
W#16#300E	4 bytes	Torque	Spindle 2
W#16#300F			
W#16#3010			
W#16#3011			
W#16#3012	2 bytes	0	
W#16#3013		1,2,3	Spindle 2 Torque trend (*)
W#16#3014	4 bytes	Angle	Spindle 2
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	2 bytes	0	
W#16#3019		1,2,3	Spindle 2 Angle trend (*)
W#16#301A	X bytes	etc.	etc.
W#16#301B			
W#16#301C			
W#16#301D			
W#16#301E			

(*) 1 = Min., 2 = Max., 3 = Accepted

J. FORMAT: Floating – Torque + Angle – Asynchronous CVI

CVI address	Floating – Torque + Angle Asynchronous CVI		
W#16#3000	2 bytes	0	
W#16#3001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#3002	4 bytes	Torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006	2 bytes	0	
W#16#3007		1,2,3	Spindle 1 Torque trend (*)
W#16#3008	4 bytes	Angle	Spindle 1
W#16#3009			
W#16#300A			
W#16#300B			
W#16#300C	2 bytes	0	
W#16#300D		1,2,3	Spindle 1 Angle trend (*)
W#16#5000	2 bytes	0	
W#16#5001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#5002	4 bytes	Torque	Spindle 2
W#16#5003			
W#16#5004			
W#16#5005			
W#16#5006	2 bytes	0	
W#16#5007		1,2,3	Spindle 2 Torque trend (*)
W#16#5008	4 bytes	Angle	Spindle 2
W#16#5009			
W#16#500A			
W#16#500B			
W#16#500C	2 bytes	0	
W#16#500D		1,2,3	Spindle 2 Angle trend (*)

(*) 1 = Min., 2 = Max., 3 = Accepted

K. FORMAT: Floating – Torque + Angle + Rate – Synchronous CVI

CVI address	Floating – Torque + Angle + Rate Synchronous CVI		
W#16#3000	2 bytes	0	
W#16#3001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#3002	4 bytes	Torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006	2 bytes	0	
W#16#3007		1,2,3	Spindle 1 Torque trend (*)
W#16#3008	4 bytes	Angle	Spindle 1
W#16#3009			
W#16#300A			
W#16#300B			
W#16#300C	2 bytes	0	
W#16#300D		1,2,3	Spindle 1 Angle trend (*)
W#16#300E	4 bytes	Rate	Spindle 1
W#16#300F			
W#16#3010			
W#16#3011			
W#16#3012	2 bytes	0	
W#16#3013		1,2,3	Spindle 1 Rate trend (*)
W#16#3014	4 bytes	Torque	Spindle 2
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	2 bytes	0	
W#16#3019		1,2,3	Spindle 2 Torque trend (*)
W#16#301A	4 bytes	Angle	Spindle 2
W#16#301B			
W#16#301C			
W#16#301D			
W#16#301E	2 bytes	0	
W#16#301F		1,2,3	Spindle 2 Angle trend (*)
W#16#3020	4 bytes	Rate	Spindle 2
W#16#3021			
W#16#3022			
W#16#3023			
W#16#3024	2 bytes	0	
W#16#3025		1,2,3	Spindle 2 Rate trend (*)
W#16#3026	etc.		
W#16#3027			
W#16#3028			
W#16#3029			

(*) 1 = Min., 2 = Max., 3 = Accepted

L. FORMAT: Floating – Torque + Angle + Rate – Asynchronous CVI

CVI address	Floating – Torque + Angle + Rate Asynchronous CVI		
W#16#3000	2 bytes	0	
W#16#3001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#3002	4 bytes	Torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006	2 bytes	0	
W#16#3007		1,2,3	Spindle 1 Torque trend (*)
W#16#3008	4 bytes	Angle	Spindle 1
W#16#3009			
W#16#300A			
W#16#300B			
W#16#300C	2 bytes	0	
W#16#300D		1,2,3	Spindle 1 Angle trend (*)
W#16#300E	4 bytes	Rate	Spindle 1
W#16#300F			
W#16#3010			
W#16#3011			
W#16#3012	2 bytes	0	
W#16#3013		1,2,3	Spindle 1 Rate trend (*)
W#16#5000	2 bytes	0	
W#16#5001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#5002	4 bytes	Torque	Spindle 2
W#16#5003			
W#16#5004			
W#16#5005			
W#16#5006	2 bytes	0	
W#16#5007		1,2,3	Spindle 2 Torque trend (*)
W#16#5008	4 bytes	Angle	Spindle 2
W#16#5009			
W#16#500A			
W#16#500B			
W#16#500C	2 bytes	0	
W#16#500D		1,2,3	Spindle 2 Angle trend (*)
W#16#500E	4 bytes	Rate	Spindle 2
W#16#500F			
W#16#5010			
W#16#5011			
W#16#5012	2 bytes	0	
W#16#5013		1,2,3	Spindle 2 Rate trend (*)

(*) 1 = Min., 2 = Max., 3 = Accepted

M. FORMAT: Floating – Torque tolerance + Angle tolerance – Synchronous CVI

CVI address	Floating – Torque tolerance + Angle tolerance Synchronous CVI		
W#16#3000	2 bytes	0	
W#16#3001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#3002	4 bytes	Min. torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006	4 bytes	Torque	Spindle 1
W#16#3007			
W#16#3008			
W#16#3009			
W#16#300A	4 bytes	Max torque	Spindle 1
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E	2 bytes	0	
W#16#300F		1,2,3	Spindle 1 Torque trend (*)
W#16#3010	4 bytes	Min. Angle	Spindle 1
W#16#3011			
W#16#3012			
W#16#3013			
W#16#3014	4 bytes	Angle	Spindle 1
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	4 bytes	Max. Angle	Spindle 1
W#16#3019			
W#16#301A			
W#16#301B			
W#16#301C	2 bytes	0	
W#16#301D		1,2,3	Spindle 1 Angle trend (*)
W#16#301E	4 bytes	Min. torque	Spindle 2
W#16#301F			
W#16#3020			
W#16#3021			
W#16#3022	4 bytes	Torque	Spindle 2
W#16#3023			
W#16#3024			
W#16#3025			
W#16#3026	4 bytes	Max torque	Spindle 2
W#16#3027			
W#16#3028			
W#16#3029			
W#16#302A	2 bytes	0	
W#16#302B		1,2,3	Spindle 2 Torque trend (*)
W#16#302C	4 bytes	Min. Angle	Spindle 2
W#16#302D			
W#16#302E			
W#16#302F			
W#16#3030	4 bytes	Angle	Spindle 2
W#16#3031			
W#16#3032			
W#16#3033			
W#16#3034	4 bytes	Max. Angle	Spindle 2
W#16#3035			
W#16#3036			
W#16#3037			
W#16#3038	2 bytes	0	
W#16#3039		1,2,3	Spindle 2 Angle trend (*)
W#16#303A	X bytes	etc.	etc.
W#16#303B			

(*) 1 = Min., 2 = Max., 3 = Accepted

N. FORMAT: Floating – Torque tolerance + Angle tolerance – Asynchronous CVI

CVI address	Floating – Torque tolerance + Angle tolerance Asynchronous CVI		
W#16#3000	2 bytes	0	
W#16#3001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#3002	4 bytes	Min. torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006	4 bytes	Torque	Spindle 1
W#16#3007			
W#16#3008			
W#16#3009			
W#16#300A	4 bytes	Max torque	Spindle 1
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E	2 bytes	0	
W#16#300F		1,2,3	Spindle 1 Torque trend (*)
W#16#3010	4 bytes	Min. Angle	Spindle 1
W#16#3011			
W#16#3012			
W#16#3013			
W#16#3014	4 bytes	Angle	Spindle 1
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	4 bytes	Max. Angle	Spindle 1
W#16#3019			
W#16#301A			
W#16#301B			
W#16#301C	2 bytes	0	
W#16#301D		1,2,3	Spindle 1 Angle trend (*)
W#16#5000	2 bytes	0	
W#16#5001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#5002	4 bytes	Min. torque	Spindle 2
W#16#5003			
W#16#5004			
W#16#5005			
W#16#5006	4 bytes	Torque	Spindle 2
W#16#5007			
W#16#5008			
W#16#5009			
W#16#500A	4 bytes	Max torque	Spindle 2
W#16#500B			
W#16#500C			
W#16#500D			
W#16#500E	2 bytes	0	
W#16#500F		1,2,3	Spindle 2 Torque trend (*)
W#16#5010	4 bytes	Min. Angle	Spindle 2
W#16#5011			
W#16#5012			
W#16#5013			
W#16#5014	4 bytes	Angle	Spindle 2
W#16#5015			
W#16#5016			
W#16#5017			
W#16#5018	4 bytes	Max. Angle	Spindle 2
W#16#5019			
W#16#501A			
W#16#501B			
W#16#501C	2 bytes	0	
W#16#501D		1,2,3	Spindle 2 Angle trend (*)

(*) 1 = Min., 2 = Max., 3 = Accepted

O. FORMAT: Floating – Torque tolerance + Angle tolerance + Rate tolerance – Synchronous CVI

O format (1/2)

CVI address	Floating – Torque tolerance + Angle tolerance + Rate tolerance Synchronous CVI		
W#16#3000	2 bytes	0	
W#16#3001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#3002	4 bytes	Min. torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006	4 bytes	Torque	Spindle 1
W#16#3007			
W#16#3008			
W#16#3009			
W#16#300A	4 bytes	Max torque	Spindle 1
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E	2 bytes	0	
W#16#300F		1,2,3	Spindle 1 Torque trend (*)
W#16#3010	4 bytes	Min. Angle	Spindle 1
W#16#3011			
W#16#3012			
W#16#3013			
W#16#3014	4 bytes	Angle	Spindle 1
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	4 bytes	Max. Angle	Spindle 1
W#16#3019			
W#16#301A			
W#16#301B			
W#16#301C	2 bytes	0	
W#16#301D		1,2,3	Spindle 1 Angle trend (*)
W#16#301E	4 bytes	Min. Rate	Spindle 1
W#16#301F			
W#16#3020			
W#16#3021			
W#16#3022	4 bytes	Rate	Spindle 1
W#16#3023			
W#16#3024			
W#16#3025			
W#16#3026	4 bytes	Max. Rate	Spindle 1
W#16#3027			
W#16#3028			
W#16#3029			
W#16#302A	2 bytes	0	
W#16#302B		1,2,3	Spindle 1 Rate trend (*)

(*) 1 = Min., 2 = Max., 3 = Accepted

O format (2/2)

CVI address	Floating – Torque tolerance + Angle tolerance + Rate tolerance Synchronous CVI		
W#16#302C	4 bytes	Min. torque	Spindle 2
W#16#302D			
W#16#302E			
W#16#302F			
W#16#3030	4 bytes	Torque	Spindle 2
W#16#3031			
W#16#3032			
W#16#3033			
W#16#3034	4 bytes	Max torque	Spindle 2
W#16#3035			
W#16#3036			
W#16#3037			
W#16#3038	2 bytes	0	
W#16#3039		1,2,3	Spindle 2 Torque trend (*)
W#16#303A	4 bytes	Min. Angle	Spindle 2
W#16#303B			
W#16#303C			
W#16#303D			
W#16#303E	4 bytes	Angle	Spindle 2
W#16#3040			
W#16#3041			
W#16#3042			
W#16#3043	4 bytes	Max. Angle	Spindle 2
W#16#3044			
W#16#3045			
W#16#3046			
W#16#3047	2 bytes	0	
W#16#3048		1,2,3	Spindle 2 Angle trend (*)
W#16#3049	4 bytes	Min. Rate	Spindle 2
W#16#304A			
W#16#304B			
W#16#304C			
W#16#304D	4 bytes	Rate	Spindle 2
W#16#304E			
W#16#304F			
W#16#3050			
W#16#3051	4 bytes	Max. Rate	Spindle 2
W#16#3052			
W#16#3053			
W#16#3054			
W#16#3055	2 bytes	0	
W#16#3056		1,2,3	Spindle 2 Rate trend (*)
W#16#3057	X bytes	etc.	etc.
W#16#3058			
W#16#3059			
W#16#305A			
W#16#305B			
W#16#305C			

(*) 1 = Min., 2 = Max., 3 = Accepted

P. FORMAT: Floating – Torque tolerance + Angle tolerance + Rate tolerance – Asynchronous CVI

P format (1/2)

CVI address	Floating – Torque tolerance + Angle tolerance + Rate tolerance Asynchronous CVI		
W#16#3000	2 bytes	0	
W#16#3001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#3002	4 bytes	Min. torque	Spindle 1
W#16#3003			
W#16#3004			
W#16#3005			
W#16#3006	4 bytes	Torque	Spindle 1
W#16#3007			
W#16#3008			
W#16#3009			
W#16#300A	4 bytes	Max torque	Spindle 1
W#16#300B			
W#16#300C			
W#16#300D			
W#16#300E	2 bytes	0	
W#16#300F		1,2,3	Spindle 1 Torque trend (*)
W#16#3010	4 bytes	Min. Angle	Spindle 1
W#16#3011			
W#16#3012			
W#16#3013			
W#16#3014	4 bytes	Angle	Spindle 1
W#16#3015			
W#16#3016			
W#16#3017			
W#16#3018	4 bytes	Max. Angle	Spindle 1
W#16#3019			
W#16#301A			
W#16#301B			
W#16#301C	2 bytes	0	
W#16#301D		1,2,3	Spindle 1 Angle trend (*)
W#16#301E	4 bytes	Min. Rate	Spindle 1
W#16#301F			
W#16#3020			
W#16#3021			
W#16#3022	4 bytes	Rate	Spindle 1
W#16#3023			
W#16#3024			
W#16#3025			
W#16#3026	4 bytes	Max. Rate	Spindle 1
W#16#3027			
W#16#3028			
W#16#3029			
W#16#302A	2 bytes	0	
W#16#302B		1,2,3	Spindle 1 Rate trend (*)

(*) 1 = Min., 2 = Max., 3 = Accepted

P format (2/2)

CVI address	Floating – Torque tolerance + Angle tolerance + Rate tolerance Asynchronous CVI		
W#16#5000	2 bytes	0	
W#16#5001		1,2	Global CVI result 0=No result 1=Accepted 2=Rejected
W#16#5002	4 bytes	Min. torque	Spindle 2
W#16#5003			
W#16#5004			
W#16#5005			
W#16#5006	4 bytes	Torque	Spindle 2
W#16#5007			
W#16#5008			
W#16#5009			
W#16#500A	4 bytes	Max torque	Spindle 2
W#16#500B			
W#16#500C			
W#16#500D			
W#16#500E	2 bytes	0	
W#16#500F		1,2,3	Spindle 2 Torque trend (*)
W#16#5010	4 bytes	Min. Angle	Spindle 2
W#16#5011			
W#16#5012			
W#16#5013			
W#16#5014	4 bytes	Angle	Spindle 2
W#16#5015			
W#16#5016			
W#16#5017			
W#16#5018	4 bytes	Max. Angle	Spindle 2
W#16#5019			
W#16#501A			
W#16#501B			
W#16#501C	2 bytes	0	
W#16#501D		1,2,3	Spindle 2 Angle trend (*)
W#16#501E	4 bytes	Min. Rate	Spindle 2
W#16#501F			
W#16#5020			
W#16#5021			
W#16#5022	4 bytes	Rate	Spindle 2
W#16#5023			
W#16#5024			
W#16#5025			
W#16#5026	4 bytes	Max. Rate	Spindle 2
W#16#5027			
W#16#5028			
W#16#5029			
W#16#502A	2 bytes	0	
W#16#502B		1,2,3	Spindle 2 Rate trend (*)

(*) 1 = Min., 2 = Max., 3 = Accepted

Q. FORMAT: ASCII – PSA mapping – Synchronous CVI

Q format (1/6)

ASCII – PSA mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#3000 W#16#3001	Report	"XX"	No report / Accepted / Rejected " " / "A" / "R"	2	Station 1
W#16#3002 W#16#3003 W#16#3004 W#16#3005	Cycle number	"XXXX"		4	Station 1
W#16#3006 W#16#3007 W#16#3008 W#16#3009	Torque unit	"XXXX"		4	Station 1
W#16#300A W#16#300B W#16#300C W#16#300D W#16#300E W#16#300F	Final Torque (result)	"XXX.XX"	Torque accuracy according to the spindle type [current Torque unit]	6	Spindle 1
W#16#3010 W#16#3011 W#16#3012 W#16#3013 W#16#3014 W#16#3015	Min. torque	"XXX.XX"		6	Spindle 1
W#16#3016 W#16#3017 W#16#3018 W#16#3019 W#16#301A W#16#301B	Target torque	"XXX.XX"		6	Spindle 1
W#16#301C W#16#301D W#16#301E W#16#301F W#16#3020 W#16#3021	Max torque	"XXX.XX"		6	Spindle 1
W#16#3022 W#16#3023	Trend torque	"XX"	No result / Low / High / Accepted " " / "<" / ">" / "="	2	Spindle 1
W#16#3024 W#16#3025 W#16#3026 W#16#3027 W#16#3028 W#16#3029	Final Angle (result)	"XXXX.X"	Angle accuracy: 0.1° [°]	6	Spindle 1
W#16#302A W#16#302B W#16#302C W#16#302D W#16#302E W#16#302F	Min. Angle	"XXXX.X"		6	Spindle 1
W#16#3030 W#16#3031 W#16#3032 W#16#3033 W#16#3034 W#16#3035	Target Angle	"XXXX.X"		6	Spindle 1
W#16#3036 W#16#3037 W#16#3038 W#16#3039 W#16#303A W#16#303B	Max. Angle	"XXXX.X"		6	Spindle 1

Q format (2/6)

ASCII – PSA mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#303C W#16#303D	Angle trend	"XX"	No result / Low / High / Accepted " " / "<" / ">" / "="	2	Spindle 1
W#16#303E W#16#303F W#16#3040 W#16#3041 W#16#3042 W#16#3043	Angular threshold [Current Torque unit]	"XXX.XX"	Torque accuracy according to the spindle type	6	Spindle 1
W#16#3044 W#16#3045 W#16#3046 W#16#3047	Set Final Speed [rpm]	"XXXX"	Last final speed.	4	Spindle 1
W#16#3048 W#16#3049 W#16#304A W#16#304B	Set Run down Speed [rpm]	"XXXX"	First run down speed phase or tightening phase.	4	Spindle 1
W#16#304C W#16#304D W#16#304E W#16#304F W#16#3050 W#16#3051	Torque correction coefficient	"XXXXXX"	Calculated when calibrating	6	Spindle 1
W#16#3052 W#16#3053	Phase number	"XX"		2	Spindle 1
W#16#3054 W#16#3055 W#16#3056 W#16#3057 W#16#3058 W#16#3059 W#16#305A W#16#305B W#16#305C W#16#305D	Serial number	"XX…XX"	10 useful characters	10	Spindle 1
W#16#305E W#16#305F W#16#3060 W#16#3061 W#16#3062 W#16#3063 W#16#3064 W#16#3065 W#16#3066 W#16#3067 W#16#3068 W#16#3069 W#16#306A W#16#306B W#16#306C W#16#306D	Spindle comment	"XX…XX"	15 useful characters	16	Spindle 1
W#16#306E W#16#306F W#16#3070 W#16#3071	Screw number	"XXXX"	3 useful characters	4	Spindle 1
W#16#3072 W#16#3073 W#16#3074 W#16#3075	Error	"XXXX"	4 useful characters: each character stands for an information group to be defined	4	Spindle 1
W#16#3076 W#16#3077 W#16#3078 W#16#3079 W#16#307A W#16#307B	Final Rate (measured)	"XX.XXX"	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 1

Q format (3/6)

ASCII – PSA mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#307C W#16#307D W#16#307E W#16#307F W#16#3080 W#16#3081	Min. Rate	“XX.XXX”	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 1
W#16#3082 W#16#3083 W#16#3084 W#16#3085 W#16#3086 W#16#3087	Target Rate	“XXXXXX”	[%]	6	Spindle 1
W#16#3088 W#16#3089 W#16#308A W#16#308B W#16#308C W#16#308D	Max. Rate	“XX.XXX”	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 1
W#16#308E W#16#308F	Trend rate	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 1
W#16#3090 W#16#3091 W#16#3092 W#16#3093 W#16#3094 W#16#3095	Final No.1 monitoring (measured)	“XXX.XX”	Unit and accuracy according to the type of value	6	Spindle 1
W#16#3096 W#16#3097 W#16#3098 W#16#3099 W#16#309A W#16#309B	Min. No.1 monitoring	“XXX.XX”		6	Spindle 1
W#16#309C W#16#309D W#16#309E W#16#309F W#16#30A0 W#16#30A1	Max. No.1 monitoring	“XXXX.X”		6	Spindle 1
W#16#30A2 W#16#30A3	No.1 monitoring trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 1
W#16#30A4 W#16#30A5 W#16#30A6 W#16#30A7 W#16#30A8 W#16#30A9	Final No. 2 monitoring (measured)	“XXXX.X”	Unit and accuracy according to the type of value	6	Spindle 1
W#16#30AA W#16#30AB W#16#30AC W#16#30AD W#16#30AE W#16#30AF	Min. No. 2 monitoring	“XXXX.X”		6	Spindle 1
W#16#30B0 W#16#30B1 W#16#30B2 W#16#30B3 W#16#30B4 W#16#30B5	Max. No. 2 monitoring	“XXXX.X”		6	Spindle 1
W#16#30B6 W#16#30B7	No. 2 monitoring trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 1

Q format (4/6)

ASCII – PSA mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#30B8	Final Torque (result)	“XXX.XX”	Torque accuracy according to the spindle type [current Torque unit]	6	Spindle 2
W#16#30B9					
W#16#30BA					
W#16#30BB					
W#16#30BC					
W#16#30BD					
W#16#30BE	Min. torque	“XXX.XX”		6	Spindle 2
W#16#30BF					
W#16#30C0					
W#16#30C1					
W#16#30C2					
W#16#30C3					
W#16#30C4	Target torque	“XXX.XX”		6	Spindle 2
W#16#30C5					
W#16#30C6					
W#16#30C7					
W#16#30C8					
W#16#30C9					
W#16#30CA	Max torque	“XXX.XX”		6	Spindle 2
W#16#30CB					
W#16#30CC					
W#16#30CD					
W#16#30CE					
W#16#30CF					
W#16#30D0	Trend torque	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 2
W#16#30D1					
W#16#30D2	Final Angle (result)	“XXXX.X”	Angle accuracy: 0.1° [°]	6	Spindle 2
W#16#30D3					
W#16#30D4					
W#16#30D5					
W#16#30D6					
W#16#30D7					
W#16#30D8	Min. Angle	“XXXX.X”		6	Spindle 2
W#16#30D9					
W#16#30DA					
W#16#30DB					
W#16#30DC					
W#16#30DD					
W#16#30DE	Target Angle	“XXXX.X”		6	Spindle 2
W#16#30DF					
W#16#30E0					
W#16#30E1					
W#16#30E2					
W#16#30E3					
W#16#30E4	Max. Angle	“XXXX.X”		6	Spindle 2
W#16#30E5					
W#16#30E6					
W#16#30E7					
W#16#30E8					
W#16#30E9					
W#16#30EA	Angle trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 2
W#16#30EB					
W#16#30EC	Angular threshold [Current Torque unit]	“XXX.XX”	Torque accuracy according to the spindle type	6	Spindle 2
W#16#30ED					
W#16#30EE					
W#16#30EF					
W#16#30F0					
W#16#30F1					

Q format (5/6)

ASCII – PSA mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#30F2	Set Final Speed [rpm]	"XXXX"	Last final speed.	4	Spindle 2
W#16#30F3					
W#16#30F4					
W#16#30F5					
W#16#30F6	Set Run down Speed [rpm]	"XXXX"	First run down speed phase or tightening phase.	4	Spindle 2
W#16#30F7					
W#16#30F8					
W#16#30F9					
W#16#30FA	Torque correction coefficient	"XXXXXX"	Calculated when calibrating	6	Spindle 2
W#16#30FB					
W#16#30FC					
W#16#30FD					
W#16#30FE					
W#16#30FF					
W#16#3100	Phase No.	"XX"		2	Spindle 2
W#16#3101					
W#16#3102	Serial No.	"XX…XX"	10 useful characters	10	Spindle 2
W#16#3103					
W#16#3104					
W#16#3105					
W#16#3106					
W#16#3107					
W#16#3108					
W#16#3109					
W#16#310A					
W#16#310B					
W#16#310C	Spindle comment	"XX…XX"	15 useful characters	16	Spindle 2
W#16#310D					
W#16#310E					
W#16#310F					
W#16#3110					
W#16#3111					
W#16#3112					
W#16#3113					
W#16#3114					
W#16#3115					
W#16#3116					
W#16#3117					
W#16#3118					
W#16#3119					
W#16#311A					
W#16#311B					
W#16#311C	Screw number	"XXXX"	3 useful characters	4	Spindle 2
W#16#311D					
W#16#311E					
W#16#311F					
W#16#3120	Error	"XXXX"	4 useful characters: each character stands for an information group to be defined	4	Spindle 2
W#16#3121					
W#16#3122					
W#16#3123					
W#16#3124	Final Rate (measured)	"XX.XXX"	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 2
W#16#3125					
W#16#3126					
W#16#3127					
W#16#3128					
W#16#3129					

Q format (6/6)

ASCII – PSA mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#312A W#16#312B W#16#312C W#16#312D W#16#312E W#16#312F	Min. Rate	“XX.XXX”	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 2
W#16#3130 W#16#3131 W#16#3132 W#16#3133 W#16#3134 W#16#3135	Target Rate	“XXXXXX”	[%]	6	Spindle 2
W#16#3136 W#16#3137 W#16#3138 W#16#3139 W#16#313A W#16#313B	Max. Rate	“XX.XXX”	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 2
W#16#313C W#16#313D	Trend rate	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 2
W#16#313E W#16#313F W#16#3140 W#16#3141 W#16#3142 W#16#3143	Final No.1 monitoring (measured)	“XXX.XX”	Unit and accuracy according to the type of value	6	Spindle 2
W#16#3144 W#16#3145 W#16#3146 W#16#3147 W#16#3148 W#16#3149	Min. No.1 monitoring	“XXX.XX”		6	Spindle 2
W#16#314A W#16#314B W#16#314C W#16#314D W#16#314E W#16#314F	Max. No.1 monitoring	“XXXX.X”		6	Spindle 2
W#16#3150 W#16#3151	No.1 monitoring trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 2
W#16#3152 W#16#3153 W#16#3154 W#16#3155 W#16#3156 W#16#3157	Final No. 2 monitoring (measured)	“XXXX.X”	Unit and accuracy according to the type of value	6	Spindle 2
W#16#3158 W#16#3159 W#16#315A W#16#315B W#16#315C W#16#315D	Min. No. 2 monitoring	“XXXX.X”		6	Spindle 2
W#16#315E W#16#315F W#16#3160 W#16#3161 W#16#3162 W#16#3163	Max. No. 2 monitoring	“XXXX.X”		6	Spindle 2
W#16#3164 W#16#3165	No. 2 monitoring trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 2

R. FORMAT: ASCII – PSA mapping – Asynchronous CVI

R format (1/6)

ASCII – PSA mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#3000 W#16#3001	Report	"XX"	No report / Accepted / Rejected " " / "A" / "R"	2	Station 1
W#16#3002 W#16#3003 W#16#3004 W#16#3005	Cycle number	"XXXX"		4	Station 1
W#16#3006 W#16#3007 W#16#3008 W#16#3009	Torque unit	"XXXX"		4	Station 1
W#16#300A W#16#300B W#16#300C W#16#300D W#16#300E W#16#300F	Final Torque (result)	"XXX.XX"	Torque accuracy according to the spindle type [current Torque unit]	6	Spindle 1
W#16#3010 W#16#3011 W#16#3012 W#16#3013 W#16#3014 W#16#3015	Min. torque	"XXX.XX"		6	Spindle 1
W#16#3016 W#16#3017 W#16#3018 W#16#3019 W#16#301A W#16#301B	Target torque	"XXX.XX"		6	Spindle 1
W#16#301C W#16#301D W#16#301E W#16#301F W#16#3020 W#16#3021	Max torque	"XXX.XX"		6	Spindle 1
W#16#3022 W#16#3023	Trend torque	"XX"	No result / Low / High / Accepted " " / "<" / ">" / "="	2	Spindle 1
W#16#3024 W#16#3025 W#16#3026 W#16#3027 W#16#3028 W#16#3029	Final Angle (result)	"XXXX.X"	Angle accuracy: 0.1° [°]	6	Spindle 1
W#16#302A W#16#302B W#16#302C W#16#302D W#16#302E W#16#302F	Min. Angle	"XXXX.X"		6	Spindle 1
W#16#3030 W#16#3031 W#16#3032 W#16#3033 W#16#3034 W#16#3035	Target Angle	"XXXX.X"		6	Spindle 1
W#16#3036 W#16#3037 W#16#3038 W#16#3039 W#16#303A W#16#303B	Max. Angle	"XXXX.X"		6	Spindle 1

R format (2/6)

ASCII – PSA mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#303C W#16#303D	Angle trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 1
W#16#303E W#16#303F W#16#3040 W#16#3041 W#16#3042 W#16#3043	Angular threshold [Current Torque unit]	“XXX.XX”	Torque accuracy according to the spindle type	6	Spindle 1
W#16#3044 W#16#3045 W#16#3046 W#16#3047	Set Final Speed [rpm]	“XXXX”	Last final speed.	4	Spindle 1
W#16#3048 W#16#3049 W#16#304A W#16#304B	Set Run down Speed [rpm]	“XXXX”	First run down speed phase or tightening phase.	4	Spindle 1
W#16#304C W#16#304D W#16#304E W#16#304F W#16#3050 W#16#3051	Torque correction coefficient	“XXXXXX”	Calculated when calibrating	6	Spindle 1
W#16#3052 W#16#3053	Phase number	“XX”		2	Spindle 1
W#16#3054 W#16#3055 W#16#3056 W#16#3057 W#16#3058 W#16#3059 W#16#305A W#16#305B W#16#305C W#16#305D	Serial number	“XX…XX”	10 useful characters	10	Spindle 1
W#16#305E W#16#305F W#16#3060 W#16#3061 W#16#3062 W#16#3063 W#16#3064 W#16#3065 W#16#3066 W#16#3067 W#16#3068 W#16#3069 W#16#306A W#16#306B W#16#306C W#16#306D	Spindle comment	“XX…XX”	15 useful characters	16	Spindle 1
W#16#306E W#16#306F W#16#3070 W#16#3071	Screw number	“XXXX”	3 useful characters	4	Spindle 1
W#16#3072 W#16#3073 W#16#3074 W#16#3075	Error	“XXXX”	4 useful characters: each character stands for an information group to be defined	4	Spindle 1
W#16#3076 W#16#3077 W#16#3078 W#16#3079 W#16#307A W#16#307B	Final Rate (measured)	“XX.XXX”	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 1

R format (3/6)

ASCII – PSA mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#307C W#16#307D W#16#307E W#16#307F W#16#3080 W#16#3081	Min. Rate	“XX.XXX”	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 1
W#16#3082 W#16#3083 W#16#3084 W#16#3085 W#16#3086 W#16#3087	Target Rate	“XXXXXX“	[%]	6	Spindle 1
W#16#3088 W#16#3089 W#16#308A W#16#308B W#16#308C W#16#308D	Max. Rate	“XX.XXX”	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 1
W#16#308E W#16#308F	Trend rate	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 1
W#16#3090 W#16#3091 W#16#3092 W#16#3093 W#16#3094 W#16#3095	Final No. 1 Monitoring (measured)	“XXX.XX”	Unit and accuracy according to the type of value	6	Spindle 1
W#16#3096 W#16#3097 W#16#3098 W#16#3099 W#16#309A W#16#309B	Monitoring n° 1 min.	“XXX.XX”		6	Spindle 1
W#16#309C W#16#309D W#16#309E W#16#309F W#16#30A0 W#16#30A1	Max. No.1 monitoring	“XXXX.X”		6	Spindle 1
W#16#30A2 W#16#30A3	No.1 monitoring trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 1
W#16#30A4 W#16#30A5 W#16#30A6 W#16#30A7 W#16#30A8 W#16#30A9	Final No. 2 Monitoring (measured)	“XXXX.X”	Unit and accuracy according to the type of value	6	Spindle 1
W#16#30AA W#16#30AB W#16#30AC W#16#30AD W#16#30AE W#16#30AF	Min. No. 2 monitoring	“XXXX.X”		6	Spindle 1
W#16#30B0 W#16#30B1 W#16#30B2 W#16#30B3 W#16#30B4 W#16#30B5	Max. No. 2 monitoring	“XXXX.X”		6	Spindle 1
W#16#30B6 W#16#30B7	No. 2 monitoring trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 1

R format (4/6)

ASCII – PSA mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#5000 W#16#5001	Report	"XX"	No report / Accepted / Rejected " " / "A" / "R"	2	Station 2
W#16#5002 W#16#5003 W#16#5004 W#16#5005	Cycle number	"XXXX"		4	Station 2
W#16#5006 W#16#5007 W#16#5008 W#16#5009	Torque unit	"XXXX"		4	Station 2
W#16#500A W#16#500B W#16#500C W#16#500D W#16#500E W#16#500F	Final Torque (result)	"XXX.XX"	Torque accuracy according to the spindle type [current Torque unit]	6	Spindle 2
W#16#5010 W#16#5011 W#16#5012 W#16#5013 W#16#5014 W#16#5015	Min. torque	"XXX.XX"		6	Spindle 2
W#16#5016 W#16#5017 W#16#5018 W#16#5019 W#16#501A W#16#501B	Target torque	"XXX.XX"		6	Spindle 2
W#16#501C W#16#501D W#16#501E W#16#501F W#16#5020 W#16#5021	Max torque	"XXX.XX"		6	Spindle 2
W#16#5022 W#16#5023	Trend torque	"XX"	No result / Low / High / Accepted " " / "<" / ">" / "="	2	Spindle 2
W#16#5024 W#16#5025 W#16#5026 W#16#5027 W#16#5028 W#16#5029	Final Angle (result)	"XXXX.X"	Angle accuracy: 0.1° [°]	6	Spindle 2
W#16#502A W#16#502B W#16#502C W#16#502D W#16#502E W#16#502F	Min. Angle	"XXXX.X"		6	Spindle 2
W#16#5050 W#16#5031 W#16#5032 W#16#5033 W#16#5034 W#16#5035	Target Angle	"XXXX.X"		6	Spindle 2
W#16#5036 W#16#5037 W#16#5038 W#16#5039 W#16#503A W#16#503B	Max. Angle	"XXXX.X"		6	Spindle 2

R format (5/6)

ASCII – PSA mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#503C W#16#503D	Angle trend	"XX"	No result / Low / High / Accepted " " / "<" / ">" / "="	2	Spindle 2
W#16#503E W#16#503F W#16#5040 W#16#5041 W#16#5042 W#16#5043	Angular threshold [Current Torque unit]	"XXX.XX"	Torque accuracy according to the spindle type.	6	Spindle 2
W#16#5044 W#16#5045 W#16#5046 W#16#5047	Set Final speed [rpm]	"XXXX"	Last final speed.	4	Spindle 2
W#16#5048 W#16#5049 W#16#504A W#16#504B	Set Run down Speed [rpm]	"XXXX"	First run down speed phase or tightening phase.	4	Spindle 2
W#16#504C W#16#504D W#16#504E W#16#504F W#16#5050 W#16#5051	Torque correction coefficient	"XXXXXX"	Calculated when calibrating	6	Spindle 2
W#16#5052 W#16#5053	Phase number	"XX"		2	Spindle 2
W#16#5054 W#16#5055 W#16#5056 W#16#5057 W#16#5058 W#16#5059 W#16#505A W#16#505B W#16#505C W#16#505D	Serial number	"XX…XX"	10 useful characters	10	Spindle 2
W#16#505E W#16#505F W#16#5060 W#16#5061 W#16#5062 W#16#5063 W#16#5064 W#16#5065 W#16#5066 W#16#5067 W#16#5068 W#16#5069 W#16#506A W#16#506B W#16#506C W#16#506D	Spindle comment	"XX…XX"	15 useful characters	16	Spindle 2
W#16#506E W#16#506F W#16#5070 W#16#5071	Screw number	"XXXX"	3 useful characters	4	Spindle 2
W#16#5072 W#16#5073 W#16#5074 W#16#5075	Error	"XXXX"	4 useful characters: each character stands for an information group to be defined	4	Spindle 2
W#16#5076 W#16#5077 W#16#5078 W#16#5079 W#16#507A W#16#507B	Final Rate (measured)	"XX.XXX"	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 2

R format (6/6)

ASCII – PSA mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#507C W#16#507D W#16#507E W#16#507F W#16#5080 W#16#5081	Min. Rate	“XX.XXX”	Rate accuracy: 1/100 [Torque unit / °]	6	Spindle 2
W#16#5082 W#16#5083 W#16#5084 W#16#5085 W#16#5086 W#16#5087	Target Rate	“XXXXXX”	[%]	6	Spindle 2
W#16#5088 W#16#5089 W#16#508A W#16#508B W#16#508C W#16#508D	Max. Rate	“XX.XXX”	[Torque unit / °]	6	Spindle 2
W#16#508E W#16#508F	Trend rate	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 2
W#16#5090 W#16#5091 W#16#5092 W#16#5093 W#16#5094 W#16#5095	Final No. 1 Monitoring (measured)	“XXX.XX”	Unit and accuracy according to the type of value	6	Spindle 2
W#16#5096 W#16#5097 W#16#5098 W#16#5099 W#16#509A W#16#509B	Monitoring n° 1 min.	“XXX.XX”		6	Spindle 2
W#16#509C W#16#509D W#16#509E W#16#509F W#16#50A0 W#16#50A1	Max. No.1 monitoring	“XXXX.X”		6	Spindle 2
W#16#50A2 W#16#50A3	No.1 monitoring trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 2
W#16#50A4 W#16#50A5 W#16#50A6 W#16#50A7 W#16#50A8 W#16#50A9	Final No. 2 Monitoring (measured)	“XXXX.X”	Unit and accuracy according to the type of value	6	Spindle 2
W#16#50AA W#16#50AB W#16#50AC W#16#50AD W#16#50AE W#16#50AF	Min. No. 2 monitoring	“XXXX.X”		6	Spindle 2
W#16#50B0 W#16#50B1 W#16#50B2 W#16#50B3 W#16#50B4 W#16#50B5	Max. No. 2 monitoring	“XXXX.X”		6	Spindle 2
W#16#50B6 W#16#50B7	No. 2 monitoring trend	“XX”	No result / Low / High / Accepted ” “ / “<” / “>” / “=”	2	Spindle 2

S. FORMAT: Floating – USK mapping – Synchronous CVI

S format (1/4)

Floating – USK mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#3000 W#16#3001	Report		0 = no report, 1 = accept, 2 = reject	2	Station 1
W#16#3002 W#16#3003	Cycle number			2	Station 1
W#16#3004 W#16#3005 W#16#3006 W#16#3007	Final torque			4	Spindle 1
W#16#3008 W#16#3009 W#16#300A W#16#300B	Min. torque			4	Spindle 1
W#16#300C W#16#300D W#16#300E W#16#300F	Target torque			4	Spindle 1
W#16#3010 W#16#3011 W#16#3012 W#16#3013	Max torque			4	Spindle 1
W#16#3014 W#16#3015	Trend torque			2	Spindle 1
W#16#3016 W#16#3017 W#16#3018 W#16#3019	Final angle			4	Spindle 1
W#16#301A W#16#301B W#16#301C W#16#301D	Min. Angle			4	Spindle 1
W#16#301E W#16#301F W#16#3020 W#16#3021	Target Angle			4	Spindle 1
W#16#3022 W#16#3023 W#16#3024 W#16#3025	Max. Angle			4	Spindle 1
W#16#3026 W#16#3027	Trend angle			2	Spindle 1
W#16#3028 W#16#3029 W#16#302A W#16#302B	Angular threshold			4	Spindle 1
W#16#302C W#16#302D	Final speed (rpm)			2	Spindle 1
W#16#302E W#16#302F	Rundown speed (rpm)			2	Spindle 1
W#16#3030 W#16#3031 W#16#3032 W#16#3033	Torque correction coefficient			4	Spindle 1
W#16#3034 W#16#3035	Phase number			2	Spindle 1
W#16#3036 W#16#3037 W#16#3038 W#16#3039	Screw number		4 ASCII	4	Spindle 1
W#16#303A W#16#303B W#16#303C W#16#303D	Final rate			4	Spindle 1

S format (2/4)

Floating – USK mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#303E	Min. Rate			4	Spindle 1
W#16#303F					
W#16#3040					
W#16#3041					
W#16#3042	Target Rate			4	Spindle 1
W#16#3043					
W#16#3044					
W#16#3045					
W#16#3046	Max. Rate			4	Spindle 1
W#16#3047					
W#16#3048					
W#16#3049					
W#16#304A	Trend rate			2	Spindle 1
W#16#304B					
W#16#304C	Trend monitoring n°1			4	Spindle 1
W#16#304D					
W#16#304E					
W#16#304F					
W#16#3050	Monitoring n°1 minimum			4	Spindle 1
W#16#3051					
W#16#3052					
W#16#3053					
W#16#3054	Monitoring n°1 maximum			4	Spindle 1
W#16#3055					
W#16#3056					
W#16#3057					
W#16#3058	Trend monitoring n°1			2	Spindle 1
W#16#3059					
W#16#305A	Trend monitoring n°2			4	Spindle 1
W#16#305B					
W#16#305C					
W#16#305D					
W#16#305E	Monitoring n°2 minimum			4	Spindle 1
W#16#305F					
W#16#3060					
W#16#3061					
W#16#3062	Monitoring n°2 maximum			4	Spindle 1
W#16#3063					
W#16#3064					
W#16#3065					
W#16#3066	Trend monitoring n°2			2	Spindle 1
W#16#3067					
W#16#30B2	Final torque			4	Spindle 2
W#16#30B3					
W#16#30B4					
W#16#30B5					
W#16#30B6	Min. torque			4	Spindle 2
W#16#30B7					
W#16#30B8					
W#16#30B9					
W#16#30BA	Target torque			4	Spindle 2
W#16#30BB					
W#16#30BC					
W#16#30BD					
W#16#30BE	Max torque			4	Spindle 2
W#16#30BF					
W#16#30C0					
W#16#30C1					
W#16#30C2	Trend torque			2	Spindle 2
W#16#30C3					

S format (3/4)

Floating – USK mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#30C4	Final angle			4	Spindle 2
W#16#30C5					
W#16#30C6					
W#16#30C7					
W#16#30C8	Min. Angle			4	Spindle 2
W#16#30C9					
W#16#30CA					
W#16#30CB					
W#16#30CC	Target Angle			4	Spindle 2
W#16#30CD					
W#16#30CE					
W#16#30CF					
W#16#30D0	Max. Angle			4	Spindle 2
W#16#30D1					
W#16#30D2					
W#16#30D3					
W#16#30D4	Trend angle			2	Spindle 2
W#16#30D5					
W#16#30D6	Angular threshold			4	Spindle 2
W#16#30D7					
W#16#30D8					
W#16#30D9					
W#16#30DA	Final speed (rpm)			2	Spindle 2
W#16#30DB					
W#16#30DC	Rundown speed (rpm)			2	Spindle 2
W#16#30DD					
W#16#30DE	Torque correction coefficient			4	Spindle 2
W#16#30DF					
W#16#30E0					
W#16#30E1					
W#16#30E2	Phase number			2	Spindle 2
W#16#30E3					
W#16#30E4	Screw number		4 ASCII	4	Spindle 2
W#16#30E5					
W#16#30E6					
W#16#30E7					
W#16#30E8	Final rate			4	Spindle 2
W#16#30E9					
W#16#30EA					
W#16#30EB					
W#16#30EC	Min. Rate			4	Spindle 2
W#16#30ED					
W#16#30EE					
W#16#30EF					
W#16#30F0	Target Rate			4	Spindle 2
W#16#30F1					
W#16#30F2					
W#16#30F3					
W#16#30F4	Max. Rate			4	Spindle 2
W#16#30F5					
W#16#30F6					
W#16#30F7					
W#16#30F8	Trend rate			2	Spindle 2
W#16#30F9					
W#16#30FA	Trend monitoring n°1			4	Spindle 2
W#16#30FB					
W#16#30FC					
W#16#30FD					

S format (4/4)

Floating – USK mapping – Synchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#30FE	Monitoring n°1 minimum			4	Spindle 2
W#16#30FF					
W#16#3100					
W#16#3101					
W#16#3102	Monitoring n°1 maximum			4	Spindle 2
W#16#3103					
W#16#3104					
W#16#3105					
W#16#3106	Trend monitoring n°1			2	Spindle 2
W#16#3107					
W#16#3108	Trend monitoring n°2			4	Spindle 2
W#16#3109					
W#16#310A					
W#16#310B					
W#16#310C	Monitoring n°2 minimum			4	Spindle 2
W#16#310D					
W#16#310E					
W#16#310F					
W#16#3110	Monitoring n°2 maximum			4	Spindle 2
W#16#3111					
W#16#3112					
W#16#3113					
W#16#3114	Trend monitoring n°2			2	Spindle 2

T. FORMAT: Floating – USK mapping – Asynchronous CVI

T format (1/4)

Floating – USK mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#3000	Report		0 = no report, 1 = accept, 2 = reject	2	Station 1
W#16#3001					
W#16#3002	Cycle number			2	Station 1
W#16#3003					
W#16#3004	Final torque			4	Spindle 1
W#16#3005					
W#16#3006					
W#16#3007					
W#16#3008	Min. torque			4	Spindle 1
W#16#3009					
W#16#300A					
W#16#300B					
W#16#300C	Target torque			4	Spindle 1
W#16#300D					
W#16#300E					
W#16#300F					
W#16#3010	Max torque			4	Spindle 1
W#16#3011					
W#16#3012					
W#16#3013					
W#16#3014	Trend torque			2	Spindle 1
W#16#3015					
W#16#3016	Final angle			4	Spindle 1
W#16#3017					
W#16#3018					
W#16#3019					
W#16#301A	Min. Angle			4	Spindle 1
W#16#301B					
W#16#301C					
W#16#301D					
W#16#301E	Target Angle			4	Spindle 1
W#16#301F					
W#16#3020					
W#16#3021					
W#16#3022	Max. Angle			4	Spindle 1
W#16#3023					
W#16#3024					
W#16#3025					
W#16#3026	Trend angle			2	Spindle 1
W#16#3027					
W#16#3028	Angular threshold			4	Spindle 1
W#16#3029					
W#16#302A					
W#16#302B					
W#16#302C	Final speed (rpm)			2	Spindle 1
W#16#302D					
W#16#302E	Rundown speed (rpm)			2	Spindle 1
W#16#302F					
W#16#3030	Torque correction coefficient			4	Spindle 1
W#16#3031					
W#16#3032					
W#16#3033					
W#16#3034	Phase number			2	Spindle 1
W#16#3035					
W#16#3036	Screw number		4 ASCII	4	Spindle 1
W#16#3037					
W#16#3038					
W#16#3039					

T format (2/4)

Floating – USK mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#303A	Final rate			4	Spindle 1
W#16#303B					
W#16#303C					
W#16#303D					
W#16#303E	Min. Rate			4	Spindle 1
W#16#303F					
W#16#3040					
W#16#3041					
W#16#3042	Target Rate			4	Spindle 1
W#16#3043					
W#16#3044					
W#16#3045					
W#16#3046	Max. Rate			4	Spindle 1
W#16#3047					
W#16#3048					
W#16#3049					
W#16#304A	Trend rate			2	Spindle 1
W#16#304B					
W#16#304C	Trend monitoring n°1			4	Spindle 1
W#16#304D					
W#16#304E					
W#16#304F					
W#16#3050	Monitoring n°1 minimum			4	Spindle 1
W#16#3051					
W#16#3052					
W#16#3053					
W#16#3054	Monitoring n°1 maximum			4	Spindle 1
W#16#3055					
W#16#3056					
W#16#3057					
W#16#3058	Trend monitoring n°1			2	Spindle 1
W#16#3059					
W#16#305A	Trend monitoring n°2			4	Spindle 1
W#16#305B					
W#16#305C					
W#16#305D					
W#16#305E	Monitoring n°2 minimum			4	Spindle 1
W#16#305F					
W#16#3060					
W#16#3061					
W#16#3062	Monitoring n°2 maximum			4	Spindle 1
W#16#3063					
W#16#3064					
W#16#3065					
W#16#3066	Trend monitoring n°2			2	Spindle 1
W#16#3067					

T format (3/4)

Floating – USK mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#5000	Report		0 = no report, 1 = accept, 2 = reject	2	Station 2
W#16#5001					
W#16#5002	Cycle number			2	Station 2
W#16#5003					
W#16#5004	Final torque			4	Spindle 2
W#16#5005					
W#16#5006					
W#16#5007					
W#16#5008	Min. torque			4	Spindle 2
W#16#5009					
W#16#500A					
W#16#500B					
W#16#500C	Target torque			4	Spindle 2
W#16#500D					
W#16#500E					
W#16#500F					
W#16#5010	Max torque			4	Spindle 2
W#16#5011					
W#16#5012					
W#16#5013					
W#16#5014	Trend torque			2	Spindle 2
W#16#5015					
W#16#5016	Final angle			4	Spindle 2
W#16#5017					
W#16#5018					
W#16#5019					
W#16#501A	Min. Angle			4	Spindle 2
W#16#501B					
W#16#501C					
W#16#501D					
W#16#501E	Target Angle			4	Spindle 2
W#16#501F					
W#16#5020					
W#16#5021					
W#16#5022	Max. Angle			4	Spindle 2
W#16#5023					
W#16#5024					
W#16#5025					
W#16#5026	Trend angle			2	Spindle 2
W#16#5027					
W#16#5028	Angular threshold			2	Spindle 2
W#16#5029					
W#16#502A					
W#16#502B					
W#16#502C	Final speed (rpm)			2	Spindle 2
W#16#502D					
W#16#502E	Rundown speed (rpm)			2	Spindle 2
W#16#502F					
W#16#5030	Torque correction coefficient			4	Spindle 2
W#16#5031					
W#16#5032					
W#16#5033					
W#16#5034	Phase number			2	Spindle 2
W#16#5035					
W#16#5036	Screw number		4 ASCII	4	Spindle 2
W#16#5037					
W#16#5038					
W#16#5039					
W#16#503A	Final rate			4	Spindle 2
W#16#503B					
W#16#503C					
W#16#503D					

T format (4/4)

Floating – USK mapping – Asynchronous CVI					
Address	**Description**	**Format**	**Comments**	**Size**	
W#16#503E	Min. Rate			4	Spindle 2
W#16#503F					
W#16#5040					
W#16#5041					
W#16#5042	Target Rate			4	Spindle 2
W#16#5043					
W#16#5044					
W#16#5045					
W#16#5046	Max. Rate			4	Spindle 2
W#16#5047					
W#16#5048					
W#16#5049					
W#16#504A	Trend rate			2	Spindle 2
W#16#504B					
W#16#504C	Trend monitoring n°1			4	Spindle 2
W#16#504D					
W#16#504E					
W#16#504F					
W#16#5050	Monitoring n°1 minimum			4	Spindle 2
W#16#5051					
W#16#5052					
W#16#5053					
W#16#5054	Monitoring n°1 maximum			4	Spindle 2
W#16#5055					
W#16#5056					
W#16#5057					
W#16#5058	Trend monitoring n°1			2	Spindle 2
W#16#5059					
W#16#505A	Trend monitoring n°2			4	Spindle 2
W#16#505B					
W#16#505C					
W#16#505D					
W#16#505E	Monitoring n°2 minimum			4	Spindle 2
W#16#505F					
W#16#5060					
W#16#5061					
W#16#5062	Monitoring n°2 maximum			4	Spindle 2
W#16#5063					
W#16#5064					
W#16#5065					
W#16#5066	Trend monitoring n°2			2	Spindle 2
W#16#5067					

APPENDIX C – Cycle programming

This function allows for modifying the paramaters of a phase in CVI II / TWINCVI II or MODCVI.

It is NOT possible to modify phase data on a MULTICVI !

The phase data modification function allows the user to change data of a previously programmed phase through the field bus. It is conceived for changing the main phase parameters, i.e. torque and angle tolerances, and for changing the set stop value. In addition, it gives access to the rotation speed, the direction of rotation, the power, etc.

However, the phase parameters data modification function does not permit changing a phase type, nor adding a phase, nor cancelling a phase. The cycles must first be programmed, either with the TWINCVI keypad or with the PC, using the CVIPC2000 software.

C.1. Data types

Mapping	DPV1 Class 100					
Address	**Instance**	**Attribute**	**Description**	**Access**	**Size bytes**	**Value**
0x0600	0x70	0x00	Cycle phase parameters	R/W	80	
0x0650	0x38	0x00	Command word	R/W	2	

C.1.1. Cycle phase parameters

Address [byte]	Description	Access	Size [bytes]	Value	Required to modify phase data		Type
0x600	Reserved for structure identification	R/W	2	0x0001			Word
0x602	Station number	R/W	1	"X"	"1" or "2" with asynchronous CVI "1" with synchronous CVI		ASCII
0x603	Cycle number	R/W	3	"XXX"	From "001" to "250"		ASCII
0x606	Phase number	R/W	2	"XX"	From "01" to "20"		ASCII
0x608	Spindle number	R/W	2		"01" with asynchronous CVI "01", "02" or "**" for the 2 spindles, in synchronous CVI		ASCII
0x60A	Phase type	R/W	2	"XX"	Search sequence phase	E1	ASCII
					Run down speed phase	P1	
					Prevailing torque phase	T1	
					Final speed torque phase	V1	
					Final speed torque phase + angle	V2	
					Final speed torque phase + angle + rate	V3	
					Final speed angle phase + torque	V4	
					Final speed angle phase + torque + rate	V5	
					Final speed yield point phase	V6	
					Final speed stall torque phase	V7	
					Run reverse torque phase	D1	
					Run reverse torque phase + angle	D2	
					Run reverse angle phase + torque	D3	
0x60C	Phase data	R/W	68	"XX ..... XX"			Structure
		Total	**80**				

C.1.2. Data phase

If any data is wrong, it will be replaced by the space character or by a void character. However, it will not be replaced in the existing phase.

All numerical data must be written in ASCII. Below, the terms “integer” and “floating” indicate whether the data may contain decimal digits or not.

Field	Format	Size	Search sequence	Run down speed	Prevailing torque	Torque	Torque + Angle	Torque + Angle + Rate	Angle + Torque	Angle + Torque + Rate	Yield point	Stall torque	Run reverse Torque	Run reverse Torque + Angle	Run reverse Angle + Torque
Rotation type (Angle or Time)	“A” / “T”	2	●												
Rotation value (angle or time)	Floating	6	●												
Number of rotations	Integer	2	●												
Time between rotations	Floating	4	●												
Target angle (prevailing torque phase)	Floating	6			●										
Min. torque	Floating	6			●	●	●	●	●	●	●	●	●	●	●
Target torque	Floating	6		●		●	●	●				●	●	●	
Max torque	Floating	6			●	●	●	●	●	●	●	●	●	●	●
Safety torque	Floating	6			●					●			●	●	●
Breakaway torque	Floating	6											●	●	
Angle threshold	Floating	6		●			●	●	●	●	●	●		●	●
Min. Angle	Floating	6					●	●	●	●	●	●		●	●
Target Angle	Floating	6							●	●					●
Max. Angle	Floating	6					●	●	●	●	●	●		●	●
Safety angle	Floating	6					●	●			●	●			
Angle after yield point	Floating	6									●				
Min. Rate	Floating	6						●		●	●				
Target torque rate in %	Integer	2									●				
Max. Rate	Floating	6						●		●	●				
Torque rate calculation window	Integer	2						●		●	●				
Stall time	Floating	4										●			
Threshold type (Angle or Time)	“A” / “T”	2			●										
Measurement threshold value	Floating	6			●										
Action on the prevailing torque operation	“+” / “-”/ “0”	2			●										
Constant shift	Floating	6			●										
Direction of rotation	“+ +” / “- -“ / “+ -“	2	●	●	●	●	●	●	●	●	●	●	●	●	●
Rotation speed	Integer	4	●	●	●	●	●	●	●	●	●	●	●	●	●
Power	Integer	4	●	●	●	●	●	●	●	●	●	●	●	●	●
Min. current	Floating	4				●	●								
Max. Current	Floating	4				●	●								

C.1.3. Search sequence phase

Description of a search sequence

Field	Format	Search sequence
Rotation type	Integer	●
Rotation value (angle or time)	Floating	●
Time between rotations	Floating	●
Number of rotations	Integer	●
Direction of rotation	Integer	●
Rotation speed	Integer	●
Power	Integer	●

Search sequence data – E1

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Rotation type (“A” / “T”)	R/W	2	« XX »
		Rotation value	R/W	6	« XXXXXX »
		Number of rotations	R/W	2	« XX »
		Time between rotations	R/W	4	« XXXX »
		Direction of rotation (“+ +” / “- -“ / “+ -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				36	

C.1.4. Run down speed phase

Description of a run down speed

Field	Format	Search sequence
Target torque	Floating	●
Angular threshold	Floating	●
Direction of rotation	Integer	●
Rotation speed	Integer	●
Power	Integer	●

Run down speed – P1

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Target torque	R/W	6	« XXXXXX »
		Angular threshold	R/W	6	« XXXXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				34	

C.1.5. Prevailing torque phase

Description of a prevailing torque

Field	Format	Search sequence
Min. / max. torque	2 floating	●
Safety torque	Floating	●
Constant shift	Floating	●
Target Angle	Floating	●
Threshold value (angle or time)	Floating	●
Threshold type	Integer	●
Action on the prevailing torque operation	Integer	●
Direction of rotation	Integer	●
Rotation speed	Integer	●
Power	Integer	●

Prevailing torque – T1

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Target Angle	R/W	6	« XXXXXX »
		Min. torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Safety torque	R/W	6	« XXXXXX »
		Threshold type (“T” / “A” / “<”)	R/W	2	« XX »
		Measurement threshold value	R/W	6	« XXXXXX »
		Action (“+” / “-”/ “0”)	R/W	2	« XX »
		Constant shift	R/W	6	« XXXXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				62	

C.1.6. Final speed phases

Description of the tightening strategies

		Strategies						
		Torque	Torque + Angle	Torque + Angle + Rate	Angle + Torque	Angle + Torque + Rate	Yield point	Stall torque
Field	**Format**							
Min. / max. torque	2 floating	●	●	●	●	●	●	●
Target torque	Floating	●	●	●				●
Safety torque	Floating					●		
Angle threshold	Floating		●	●	●	●	●	●
Min. / max. angle	2 floating		●	●	●	●	●	●
Target Angle	Floating				●	●		
Safety angle	Floating		●	●			●	●
Min. / max. rate	2 floating			●		●	●	
Target torque rate in %	Integer						●	
Torque rate calculation window	Integer			●		●	●	
Rotation speed	Integer	●	●	●	●	●	●	●
Power	Integer	●	●	●	●	●	●	●
Direction of rotation	Integer	●	●	●	●	●	●	●
Min. / max. current	2 floating	●	●					
Angle after yield point	Floating						●	
Stall time	Floating							●

Final speed torque – V1

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Target torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
		Min. current	R/W	4	« XXXX »
		Max. Current	R/W	4	« XXXX »
				48	

Final speed torque + angle – V2

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Target torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Angle threshold	R/W	6	« XXXXXX »
		Min. Angle	R/W	6	« XXXXXX »
		Max. Angle	R/W	6	« XXXXXX »
		Safety angle	R/W	6	« XXXXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
		Min. current	R/W	4	« XXXX »
		Max. Current	R/W	4	« XXXX »
				72	

Final speed torque + angle + rate – V3

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Target torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Angular threshold	R/W	6	« XXXXXX »
		Min. Angle	R/W	6	« XXXXXX »
		Max. Angle	R/W	6	« XXXXXX »
		Safety angle	R/W	6	« XXXXXX »
		Min. Rate	R/W	6	« XXXXXX »
		Max. Rate	R/W	6	« XXXXXX »
		Number of degrees to calculate the rate	R/W	2	« XX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				78	

Final speed angle + torque – V4

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Angular threshold	R/W	6	« XXXXXX »
		Min. Angle	R/W	6	« XXXXXX »
		Target Angle	R/W	6	« XXXXXX »
		Max. Angle	R/W	6	« XXXXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				58	

Final speed angle + torque + rate – V5

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Safety torque	R/W	6	« XXXXXX »
		Angular threshold	R/W	6	« XXXXXX »
		Min. Angle	R/W	6	« XXXXXX »
		Target Angle	R/W	6	« XXXXXX »
		Max. Angle	R/W	6	« XXXXXX »
		Min. Rate	R/W	6	« XXXXXX »
		Max. Rate	R/W	6	« XXXXXX »
		Number of degrees to calculate the rate	R/W	2	« XX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				78	

Final speed Yield point – V6

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Angular threshold	R/W	6	« XXXXXX »
		Min. Angle	R/W	6	« XXXXXX »
		Max. Angle	R/W	6	« XXXXXX »
		Safety angle	R/W	6	« XXXXXX »
		Angle after yield point	R/W	6	« XXXXXX »
		Min. Rate	R/W	6	« XXXXXX »
		Target Rate in %	R/W	2	« XX »
		Max. Rate	R/W	6	« XXXXXX »
		Number of degrees to calculate the rate	R/W	2	« XX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				80	

Final speed stall torque – V7

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Target torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Angular threshold	R/W	6	« XXXXXX »
		Min. Angle	R/W	6	« XXXXXX »
		Max. Angle	R/W	6	« XXXXXX »
		Safety angle	R/W	6	« XXXXXX »
		Stall time	R/W	4	« XXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				68	

C.1.7. Run reverse phases

Description of the run reverse strategies

	Strategies	Torque	Torque + angle	Torque + angle + rate
Field	**Format**			
Min. / max. torque	2 floating	●	●	●
Target torque	Floating	●	●	
Breakaway torque	Floating	●	●	
Safety torque	Floating	●	●	●
Angular threshold	Floating		●	●
Min. / max. angle	2 floating		●	●
Target Angle	Floating			●
Rotation speed	Integer	●	●	●
Power	Integer	●	●	●
Direction of rotation	Integer	●	●	●

Run reverse by torque – D1

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Target torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Safety torque	R/W	6	« XXXXXX »
		Breakaway torque	R/W	6	« XXXXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				52	

Run reverse by torque + angle – D2

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Target torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Safety torque	R/W	6	« XXXXXX »
		Breakaway torque	R/W	6	« XXXXXX »
		Angular threshold	R/W	6	« XXXXXX »
		Min. Angle	R/W	6	« XXXXXX »
		Max. Angle	R/W	6	« XXXXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				70	

Run reverse by angle + torque – D3

Address [byte]	Address [word]	Description	Access	Size	Value
0x600	**0x300**	**Header (station, cycle, phase…)**	**R/W**	**12**	
		Min. torque	R/W	6	« XXXXXX »
		Max torque	R/W	6	« XXXXXX »
		Safety torque	R/W	6	« XXXXXX »
		Angular threshold	R/W	6	« XXXXXX »
		Min. Angle	R/W	6	« XXXXXX »
		Target Angle	R/W	6	« XXXXXX »
		Max. Angle	R/W	6	« XXXXXX »
		Direction of rotation (“+ +” / “- -“)	R/W	2	« XX »
		Rotation speed	R/W	4	« XXXX »
		Power	R/W	4	« XXXX »
				64	

C.2. Command word

Une programmation de cycle ou une lecture de cycle n'est prise en compte qu'après validation par l'API : celui-ci doit écrire le mot de commande à l'adresse 0x650. Lorsque l'API atteint les données de la phase, il doit mettre le LSB (LSB = least significant byte, octet de poids faible) du mot de commande à zéro et programmer le MSB (MSB = most significant byte, octet de poids fort) du mot de commande comme indiqué dans le tableau ci-dessous :

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Command to Write / Read		Counter					

0x80	⇔	To write
0x40	⇔	To read

Warning: The counter must be changed at each reading or writing.

Once the CVI has programmed the phase or finished the reading of the phase, it resets the MSB and gives a report in the LSB:

Bit no.	Mask value	Description
7	0x80	1 ⇔ Done 0 ⇔ in process
6	0x40	1 ⇔ Error detected 0 ⇔ No error
5	0x20	Not used – **set to 0**
4	0x10	1 ⇔ Error – cycle is running or programming is being done
3	0x08	1 ⇔ Error – no phase
2	0x04	1 ⇔ Error – phase number not correct Phase registered in the CVI different from the phase the operator tries to program
1	0x02	1 ⇔ Error – access to phase.
0	0x01	1 ⇔ Error – wrong parameter (station, spindle, phase or cycle no.)

The command word must be updated last.
That is the reason why it is located at the end of the phase data.

APPENDIX D – Setting the options

This section is for Desoutter technicians only!

D.1. Options for the recording of the tightening results

Address [bytes]	8 bit word (table of 64 words)	Size	Option No.
0xF000		1	1
0xF03F		1	64

Address [bytes]	16 bit word (table of 64 words)		Size	Option No.
0xF040	**Max. Number of spindles**	1 to 32	2	1
0xF052 (word N° 10)	**VALUES** **Mask for the values giving the result:** **bit1 = Torque, bit2 = Angle, bit3 = Rate** 0x0001 => Torque 0x0002 => Angle 0x0004 => Rate 0x0008 => Tension Ex: 0x0001=T, 0x0003=T+A, 0x0007=T+A+R	0 to 0x000F (default value: 0x0007)	2	Word 10 from FlashRDE
0xF054 (word N° 11)	**FORMAT** **Format of the values giving the result:** 0 => ASCII, 1 => natural MOTOROLA 2 => natural INTEL	0 to 0x0002 (default value: 0x0000 in ASCII)	2	Word 11 from FlashRDE
0xF056 (word N° 12)	**Type** **Type of values giving the result:** 0 => min., final, max., trend (= type 3) 1 => final, trend 2 => trend 3 => idem type 0 4 => specific for PSA 0702	0 to 0x0004 (default value: 0x0001)	2	Word 12 from FlashRDE
0xF0BE			**2**	**64**

Long word No.	32 bit word (table of 32 words)	Size	Option No.
0xF0C0		4	1
0xF13C		4	32

D.2. Other options of the CVI

In option zone of the CVI (TWINCVI, MODCVI, MULTICVI), several parameters are taken into account for the memory mapping management. You will find hereafter the information (described on the previous pages) which can be adjusted through the "flashrde" program for example.

Values stored in the tightening result zone

16 bit word no 10 (default value 0x07)	
01	Torque
02	Angle
04	Rate
08	Tension (not used yet)

This system works like a mask, 7 = 1 + 2 + 4 ⇔ Torque + Angle + Rate

Format of the values stored in the tightening result zone

16 bit word no 11 (default value 0)	
0	ASCII format
1	Motorola floating format
2	Intel floating format

Value types stored in the tightening result zone

16 bit word no 12 (default value 01)	
0	Min. tolerance, final value, max. tolerance, report
1	Torque
2	Angle
3	Idem type 0
4	Specific to PSA 0702

Memory size reserved for the standard mapping

16 bit word no 18 (default value 32 h or 50 d)

It is the number of 16 bytes memory blocs reserved for the mapping. This option allows for setting the used memory size according to the number of spindles commanded by the system.

By default, it is set to 32 hexadecimal, i.e. 50 decimal (50 x 16 =800 bytes).

Value types stored in the tightening result zone

16 bit word no 26 (default value 32 h or 50 d)

It is the number of 16 bytes memory blocs reserved for the exchange zone with ISAGRAF.

By default, it is set to 32 hexadecimal, i.e. 50 decimal (50 x 16 =800 bytes).