REXROTH SERVO DRIVES PROGRAMMING:



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1.0 Rexroth Servo drives set-up/configuration:

SET UP ENGINEERING IP ADDRESS:

• To initially communicate with the servo drive, set the engineering IP address manually through the drive keypad. Access **parameter 2.3.7** to enter the IP address used to allow the computer the ability to communicate with the Servo Drive. The procedure is a follows:



With the display blinking the servo drive indicates it is in program mode. Access the parameter below to enter the IP Address.



- Parameter needed to enter engineering IP address is **parameter 2.3.7**
- Press the up "arrow" button to access 2. Then hit "enter"
- Press the up "arrow" button to access 3. Then hit "enter"
- Press the up "arrow" button to access 7. Then hit "enter"
- NOW ENTER THE IP ADDRESS = → 192.168.1.xxx
- Cycle power for new address to take effect

2.0 ESTABLISHING COMMUNICATION:

Authentication Advanced	2 · · · · · · · · ·					
ect using	14				Internet Protocol (TCP/P) Properties	2 23
Invadices 570x Gigsbit Integrated Co					Canada Contraction of the Contra	
						1
his connection uses the following items:					You can get IP settings assigned automatically if your ne this capability. Otherwise, you need to ask your network.	twok supports edministrator for
Tag Jaco Packet Scheduler Tag Jaco Packet Scheduler Tag Jaco Packet Scheduler Tag Jaco Packet Scheduler	1. Contract (1. Co				the appropriate IP settings	
M 10 ^m Internet Protocol (TCP/IP)	Two deserves our				O Oblam an IP address automatically	
e					Use the following IP address:	
Fight United Property	Search Polders			200 B	IP address 192 168	245
Description	8			e 🛃 60	Subnet mark: 255 . 255 . 2	95.0
Transmission Control Protocol/Internet Protocol. The default	Name	Туре	Status	Device No	Default gateway	N
across diverse interconnected networks	Diar-up			100000	Colores Millioner et als anno 1	
Show icon in notification area when connected	& Dial-up Connection	Dial-up	Disconnected	Conexant	Use the following DNS server addresses	
Notify me when this connection has limited or no connectivity	LAN or High-Speed Internet				Performed DNS servers	
	Local Area Connection	LAN or High-Speed Inter	Network cable unplugged	Broadcom	Alternate DNS recent	
	A 1394 Connection	LAN or High-Speed Inter	Connected	1394 Net	Constant ones terro.	
	Wireless Network Connection	LAN or High Speed Inter	Not connected	Intel(P) P		Advanced
CONTRACTOR .						
Other Places	(a)				OK.	Cancel
(D. subject)						
Sa Pro factorial Places						
My Decumenter						
My Computer						
1						
Details	(A)					
Local Area Connection						
LAN or High Speed Intern	et -					
Network cable unplugged						
Broadcore Sittle Capital	M. S.					
produces since again another						
art 🖉 🙆 🚳 📑 🔂 Indowensis Expression	Network Connectoron 👍 Local Area Connect					(<mark>)</mark>

TO SET UP LAPTOP IP ADDRESS:

Typical "Internet Protocol Properties" for communication to Drive.

TO PING THE DRIVE:

Goto Control Panel/Run. Then enter "cmd".

Run	? 🗙
-	Type the name of a program, folder, document, or Internet resource, and Windows will open it for you.
Open:	Emd 🕑
	OK Cancel Browse

Type PING then enter the drive Ethernet address and hit enter.



3.0 START REXROTH INDRAWORKS SOFTWARE:

• Use latest version **9.12.331.0.** From Windows Start Menu See path below:



Start a new project:

	ndraWorks Enginee	ring
<u>Fi</u> le	<u>E</u> dit <u>Vi</u> ew <u>P</u> rojec	t <u>D</u> iagnostics <u>T</u> ools <u>W</u> indow <u>H</u> elp
	<u>N</u> ew ►	🛐 Project Ctrl+Shift+N 🔥 🄜 🔍 🗽 🖄 🖕 😭 📾 🥪
	Open 🕨	🚈 Workspace Ctrl+Alt+N 🕂 🕂 🗙
	<u>⊂l</u> ose ►	🛅 <u>Fi</u> le Ctrl+N 🔼
	<u>S</u> ave Ctrl+S	1) CuberCarriage 3) CuberHoist
	Save <u>A</u> s	5] CuberRotation
Ø	Save All	7] CuberClamp1 9] CuberClamp2
Q.	Print Preview	P] Depal1Clamp2
9	Print Ctrl+P	29) DePal Pusher
	Print Settings	
	Recent Projects 🔹 🕨	23] DePal Hoist
	E <u>xi</u> t	

Enter project name:

Create New Project	X
Name:	
Cuber Line2	
Directory:	
C:\Documents and Settings\gergab\My Documents	Browse
Project will be created in:	
C:\Documents and Settings\gergab\My Documents\Cuber Line2	
Project language:	
English (United States)	V Fonts
OK Cancel	Help

- 🔳 IndraWorks Engineering <u>Fi</u>le <u>E</u>dit <u>Vi</u>ew Project Diagnostics <u>H</u>elp <u>T</u>ools <u>Wi</u>ndow 🏘 🔝 🎯 💂 🔍 🖻 🛃 🚽 🎦 👼 🕹 🖻 Switch Devices Offline... 📾 Project Explore 🔜 Switch Devices O<u>nl</u>ine... 🖃 🗝 📷 Project1 品 Start Offline Parameterizations... ~ Scan For <u>D</u>evices... Add ۲ Ð ¢ **1** Archive... Ð 📃 НМ 🛃 <u>R</u>estore... ė <u>L</u>anguage ۲ Export... ÷ Import... . HM Retwork Configuration 5 Power Supply ÷..... 👄 Axis [15] CuberRotation Local I/Os ė HMS01.1 [17] CuberClamp1 Master Communication Power Supply Axis [17] CuberClamp1 Cal Local I/Os ¥ ÷ 2350/3 8
- FROM REXROTH SOFTWARE, IN THE PROJECTS MENU, SCAN FOR DEVICES;

• Choose "IndraDrive (Ethernet)":

Scan for Devices											
Select Devices The way how to scan for the device is given in brackets.											
Installed: EcoDrive Cs (Serial RS232) HNC100-3X / AirNC (Serial RS232) IndraDrive (Profibus) IndraDrive (Serial RS232) IndraDrive (Serial RS232) Sercans I (Serial RS232) Sercans II (PCI) Sercans III (PCI) Sercans III (Serial RS232)	Scan for: IndraDrive (Ethernet)										
Next >> Cancel											

• Enter IP address of Drives to be Scanned:

Scan for Devices	
Device: IndraDrive (Ethernet) Select IP address and IP port.	
- IP Address	IP Port
The maximum value for an IP address is 255,255,255,255.	The possible values for an IP port are between 0 and 65535.
From:	From:
192.168.1.142	5002
To:	To:
192.168.1.143	
	Advanced
	Default
Konstant Constant	Cancel

Drives that are online will show up in the dialog box below:

Scan for Devices			
List of Found Devices Select device(s) to be added	to the project.		
 ✓ HMS01.1 ✓ HMS01.1 ✓ HMS01.1 ✓ HMS01.1 ✓ HMS01.1 ✓ HMS01.1 			
IndraDrive IP address: 192.168.1.120 IP port: 5002			Start Stop
	<< <u>B</u> ack	<u> </u>	Cancel

Project screen with showing all drives in the system:

To get online with a particular drive, highlight the particular drive desired and do the following:

Right click on the drive and select "Switch Online".

🖬 IndraWorks Engineering 📃 🗖 🔀
<u>File Edit View Project HMS01.1 Diagnostics Tools Window H</u> elp
🎦 💼 🕼 🗠 여 🗇 🚽 💷 🚛 🏭 🎥 💽 💽 🖉 🚽 🔶 🌺 🍟
📾 Project Explorer 🗾 👻 में 🗙
Cuber Line1 HMS01.1 [11] CuberCarriage HMS01.1 [13] CuberHoist HMS01.1 [15] CuberRotation HMS01.1 [17] CuberClamp1 HMS01.1 [19] CuberClamp2 HMS01.1 [27] Depal1Clamp2 HMS01.1 [31] Depal1WB
HMS01.1 [21] DePalC Switch Online
HMS01.1 [25] Depart 4 Start Offline Parameterization
Adjust Online/Offline Parameterization
Functional Packages
IP Settings

To make edits Online find the "Start Parameterization Level 1" option and click. This option becomes visible when Online.

To make edits Offline click on "Start Offline Parameterization" option.

File Edit View Project HMS01.1 Diagnostics Tools Window Help Image: State	🔳 In	ndraWorks Engineering
Project Explorer Cuber Line1 HMS01.1 [13] CuberCarriage HMS01.1 [13] CuberHoist HMS01.1 [15] CuberClamp1 HMS01.1 [17] CuberClamp2 HMS01.1 [27] Depal1Clamp2 HMS01.1 [29] DePal Pusher HMS01.1 [21] DePalCarriage HMS01.1 [23] DePal Hoist HMS01.1 [25] Depal1Clamp1 RED-ONLINE HMS01.1 [25] Depal1Clamp1 RED-ONLINE FAULTED	<u>Fi</u> le	Edit <u>V</u> iew Project HMS01.1 <u>Di</u> agnostics <u>T</u> ools <u>W</u> indow <u>H</u> elp
Project Explorer Cuber Line1 HMS01.1 [13] CuberCarriage HMS01.1 [15] CuberRotation HMS01.1 [17] CuberClamp1 HMS01.1 [17] CuberClamp2 HMS01.1 [27] Depal1Clamp2 HMS01.1 [29] DePal Pusher HMS01.1 [21] DepalTURB HMS01.1 [23] DePal Hoist HMS01.1 [25] Depal1Clamp1 RED-ONLINE FAULTED	1	중 사 🖻 🛍 🗠 여 (수) 📮 💷 🚽 🔜 🔜 💽 (철) 🚽 🚽 🚖 🗮 🔜 🚽
Cuber Line1 HMS01.1 [1] CuberCarriage HMS01.1 [13] CuberHoist HMS01.1 [15] CuberClamp1 HMS01.1 [17] CuberClamp2 HMS01.1 [27] Depal1Clamp2 HMS01.1 [27] Depal1Clamp2 HMS01.1 [27] Depal1Clamp2 HMS01.1 [21] DePal Pusher HMS01.1 [21] DePalCarriage HMS01.1 [23] DePal Hoist HMS01.1 [25] Depal1 Clamp1 RED-ONLINE FAULTED	👘 Pr	roject Explorer 🗾 👻 🕂 🗙
		Cuber Line1 HMS01.1 [11] CuberCarriage HMS01.1 [13] CuberHoist HMS01.1 [15] CuberRotation HMS01.1 [17] CuberClamp1 HMS01.1 [17] CuberClamp2 HMS01.1 [27] Depal1Clamp2 HMS01.1 [29] DePal Pusher HMS01.1 [29] DePal Pusher HMS01.1 [21] DePalCarriage HMS01.1 [21] DePalCarriage HMS01.1 [25] Depal1Clamp1 RED-ONLINE FAULTED

DRIVE STATUS SCREEN AS SHOWN ABOVE:

The color of the drive names above indicates the status of the drive. The COLOR codes are as follows:

BLACK – Drive is OFFLINE. BLUE – Drive is ONLINE HAPPY with no FAULTS. RED – Drive is ONLINE and a FAULT EXISTS. ORANGE – Drive is in OFFLINE PARAMETERIZATION mode (not shown above).

4.0 LOAD DEFAULT DRIVE PARAMETERS:

This is done to clear the memory to assure a clean start on the project

	Indr	aWor	ks En	gineeri	ng																
File	e E	dit	/iew	Project	Drive2	Diagnostics	s Tools	Window	v Help												
	1 👩	3 X	Ē		n Ci	👄 🝦 🐰	1 🔜 🗄	<mark>≞ ∖ </mark>	ک 🖻	= 😫	- M	<u>\$</u>	1	PM	OM	PA	52	Ŧ			
61	Proje	ect Ex	plorer					. .	4 ×												
	- 6	Clan	npCube	r2																	
	E]	• НМЗ ника	01.1 [51] 01.1 [52]	Depal2	Carriage Hoist															
	E E	Ē	HMS	01.1 (55) 01.1 (55)	Depai2	Clamp1															
	H]	HMS	01.1 [57]] Depal2	Clamp2															
	H]	HMS	01.1 [59]] Depal2	Pusher															
	E C		НМ9	01.1 [61] 01.1 [41]] Depal2 1 Cuber2	WB Carriago															
		j	HMS	01.1 [43]	Cuber2	Lamage Hoist															
	H]	HMS	01.1 [45]] Cuber2	Rotation															
	H] 🕎	HMS	01.1 [47]	Cuber2	Clamp1															
	1		HMS - HCS	01.1 [49] 02 1 [21]	J Cuber2 Drive2	Clamp2															
		' 🖻	5 nc5	Power	Supply																
		6	·····	Axis [2]	D	Axis Status	+ I														
		G		a Virt. Ma I- Measu	ast rin	Parameters	• 5	Param	eter Edito	or											
			····· Þ	Positio	n 9 🔎	Diagnosis	► Ø	Search	n Paramet	ers											
		B	·····) Local I	/U	Re <u>n</u> ame	F2 💈	🗧 Param	eter Grou	ιp											
					P	Properties		Drive	Command	s											
							e e e e e e e e e e e e e e e e e e e	👂 Loadir	ig Basic Pa	arameters.											
							Ğ	Drive	Password			•									
								Storag	je Mode												
								Save I	Parameter	rs on Drive	Flash										
							€	Printin	g in File												



LOAD DRIVE PARAMETERS FROM EXISTING PROJECT:

🖬 IndraWorks Engineering			
File Edit View Project HMS01.1	<u>Di</u> agnostics <u>T</u> ools	<u>Wi</u> ndow <u>H</u>	<u>t</u> elp
အခြံ ကြိုင်းမျိုးမျိုးမျိုးမျိုး	- 🛃 🎿 🛃 🔽	K 1 🖭 🛃	1 - 🙀 🌟 🌺 🔤 🔇 IPM OM 💷 📰 -
📾 Project Explorer		• # ×	
Project1 Master Commu Power Supply Axis [11] Cube Axis [11] Cube Master	Switch Offline Switch Online Functional Packages		
i → → → → → → → → → → → → → → → → → → →	Parameters	<u> </u>	Parameter Editor
🗈 🫅 Limit Va	Firmware Management	. <u>\$</u>	Parameter Group
	<u>D</u> elete	Del 📠	Saving
	Re <u>n</u> ame	F2 🏙	Loading
⊨ ` N 😭	Properties		MMC Settings
	Field Control		Creating Operating Data for MMC
	Current Limits Current Control Open-Loop U/f Control	~	

Load Parameters							
C:\Documents and Settings\gergab\My Documents\CubeClamp2.par							
Parameter set from file	Target address	Name					
	11	Axis [11] CuberCarriage					
The selected file only contains one parameter set. Please select the axis/axes to which this parameter set is to be loaded.							
Load retain data	Load retain data						

Set System Communication Protocol from "Master Communication" project tree:

a IndraWorks Engineering - Master Com File Edit <u>Vi</u> ew Project Diagnostics <u>T</u> oc	munication - HMS01.1 [11] CuberCarriage
🎁 着 👗 🖻 💼 🗠 여 👄 🚽	🔜 🔜 🖂 🔯 🛃 🚽 🚖 🌺 🔜 🔇 PM OM 🖭 📾 🖕
🖬 Project Explorer 🛛 👻 म 🗙	Master Communication - HMS01.1 [11] CuberCarriage
Project1 Project1 HMS01.1 [11] CuberCarriage	Basic settings of master communication Engineering over IP EtherNet/IP
Master Communication Power Supply Axis [11] CuberCarriage	Master communication type Multi-Ethernet
Local I/Os HMS01.1 [13] CuberHoist Master Communication	Basic setting EtherNet/IP
Power Supply Axis [13] CuberHoist	
HMS01.1 [15] CuberRotation	
Master Communication Power Supply Avis [15] CuberBotation	▲ Changes in the basic settings will only be active after the drive has been booted!
Local I/Os MS01.1 [17] CuberClamp1	

Set to EtherNet/IP.

Engineering IP address should be set from Key Pad on front of drive:

🔳 IndraWorks Engineering - Master Co	mmu	nication - HMS01.1 [11] CuberCarriage	
<u>File Edit View Project Diagnostics]</u>	ools	Window Help	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		🄜 🔜 🔍 🖻 🛃 🚽 🚖 🌺 🔜 🔇 PM OM 📾 📾 💂	
🕤 Project Explorer 🔹 🖣	·×	Master Communication - HMS01.1 [11] CuberCarriage	
HMS01.1 [11] CuberCarriage Master Communication Power Supply Axis [11] CuberCarriage Local I/Os Master Communication Power Supply Axis [13] CuberHoist Master Communication Power Supply Axis [13] CuberHoist Local I/Os Master Communication Master Communication		Basic settings of master communication Engineering over IP EtherNet/IP MAC address 00-00-00-00-00 IP address Network mask Default gateway Status	tivate IP Setti IP Communic
Power Supply	~		

Set Communication to PLC IP Address from "Master Communication" project tree:

Indraworks Engineering - Master Commi	Inication - HMSU1.1 [11] Cubercarriag	ge	
File Edit View Project Diagnostics Tools	<u>Window H</u> elp		
🎦 着 X 🖻 🖻 lo o o i 👄 🚽 🛃	, 🔜 🖳 🔍 🐚 🛃 🚽 🚖 🏘 🛛	🛃 🚱 PM OM 📧 🖬 🚽	
🖬 Project Explorer 🔷 👻 🕂 🗧	Master Communication - HMS01.*	1 [11] CuberCarriage	
□ ⊟ @] Project1 □	HMS01.1 [11] CuberCarriage		
Master Communication	Basic settings of master communication Er	ngineering over IP EtherNet/IP	
Axis [11] CuberCarriage			
Europe HMS01 1 (13) CuberHoist	Device MAC address	00-00-00-00-00	
Master Communication	IP address	192.168. 1 .111	EtherNet/IP
Power Supply Avis [13] CuberHoist	Network mask	255.255.255.0	
E Local I/Os	Default gateway	0.0.0	Activate IP Setting:
HMS01.1 [15] CuberRotation	Field bus: diagnostic message	OFFLINE	
Power Supply	Watchdog time		
🗈 🖨 Axis (15) CuberRotation	Internal copy time of process data	2000 us	
HMS01.1 [17] CuberClamp1	Configuration connection point	110	
Master Lommunication Power Supply	Assembly connection point (AT)	102	
Axis [17] CuberClamp1	Assembly connection point (MDT)	101	
HMS01.1 [19] CuberClamp2			
Master Communication Power Supply			
Axis [19] CuberClamp2			
i∃ iii Local I/Os			

Enter IP address for Servo Drive.

Set Language to English. Parameter P265 (or S265) is where desired language is set:

Para	me	ter Editor - HM501.1 [11] CuberCarriage : Axis [11] CuberCarri 🔀
•	Axi	is [11] CuberCarriage 🏻 🌺 📰 📰 🦉
IDN	P-(0-0265.0.0 · © © 🖺 🗏 🗏 🖉
Nam	ne	
Stal	tus	
Min		
Мая	•	
¥alu	Je	1
😢 н	DN r	not available

Value = 1, for ENGLISH

Set SERVO Node to be the last 3 digits of IP ADDRESS. Change Parameter P4025 for SERVO Node:

Parame	ter Editor - HM501.1 [11] CuberCarriage : Axis [11] CuberCarri 🔀
🖨 🗛	s [11] CuberCarriage 🏻 🌺 譳 🛼 🦉
IDN P-0	-4025.0.0 🔹 🕲 🕲 🖺 🖶 🗟 🗟
Name	Drive address of master communication Write list (Enter)
Status	OK CK
Min	1
Мах	99
¥alue	11

Enter node Number in VALUE field.

NOW POWER DOWN SERVO AND THEN POWER BACK UP SO THAT COMMUNICATION IP ADDRESS WILL BE SAVED AND THE ETHERNET PARAMETERS WILL BE VISIBLE!!!

SET UP INDIVIDUAL SERVO MOTOR PARAMETERS, COMMUNICATIONS, OPERATION AND MOTOR DATA :

Open Axis:



Open Master Communication - Axis:



SET UP REAL-TIME INPUT (AT) PARAMETERS:

These are typical communication parameters (Servo Drive to PLC).



These parameters are for Cuber Clamps (Servo Drive to PLC).



SET UP REAL-TIME OUTPUT (MDT) PARAMETERS:

These are typical communication parameters (PLC to Servo Drive).

🖬 IndraWorks Engineering - Settings - Axis [51] Depa		
<u>File Edit View Project Diagnostics Tools Wi</u> ndow	<u>H</u> elp	
🎦 着 👗 🛍 🛍 🗠 여 😂 🚽 🚨 🔒	🕅 🖻 🖉	🚽 🚖 🌺 🔜 🞯 ipm om ibe be 💂
ा Project Explorer 🗸 🗸	× epal2 Carria	ge Settings - Axis [51] Depal2 Carriage 🔹 🕨 🗙
🖨 📴 HMS01.1 [55] Depal2 Clamp1		A
Master Lommunication Power Supplu	Axis mo	de Operating mode
Axis [55] Depal2 Clamp1	Field bu	is diagnostic OFFLINE
🖨 🔤 Master Communication - Axis	Data Ch	Real-time input (AT) Beal-time output (MDT)
Settings Multipley Channel	Data Ch	
Signal Control Word	Profile	type Freely configurable mode
Signal Status Word	No.	Config list cyclic command data channel
Motor, Brake, Measuring Systems		P-0-4077 : Field bus: control word
Galing / Mechanical System Galing / Mechanical System		2 S-0-0145 : Signal control word
Drive Control		4 S-0-0256 : Larget position 4 S-0-0259 : Positioning velocitu
🖃 🦳 Operation Modes / Drive Halt	-	5 S-0-0260 : Positioning acceleration
Operation Modes Drive Hall		S-0-0359 : Positioning deceleration
		7
Probe		✓
🚊 🖳 Optimization / Commissioning	✓	

These parameters are for Cuber Clamps (PLC to Servo Drive).

🗟 IndraWorks Engineering - Settings - Axis [55] Depa	al2 (amp1	
<u>File Edit View Project Diagnostics Tools Wi</u> ndow	Help		
🎦 🗂 🕹 🖻 🖻 🗠 🖓 🚽 🛃 🛃	3	🔌 🛃 🚽 🚖 🌺 📰 🥸 I	PM OM EE EH -
ा Project Explorer 🔹 🕂	×	Settings - Axis [55] Depal2 C	Clamp1 Master Commu 4 🕨 🗙
Moster Communication Power Supply	2	Data Channel Real-time input (AT)	Real-time output (MDT)
Avis (55) Depa/2 Clamp1 Avis (55) Master Communication - Avia		Profile type Freely confi	gurable mode
Master Communication - Axis Settings Multiplex Channel Signal Control Word Signal Status Word Communication / Mechanical Systems Communication / Mechanical System Communication / Drive Halt Communication / Drive Halt Communication Probe Communication / Commissioning		No. Contig list cyclic command d 1 P-0-4077 : Field bus: control 2 S-0-0145 : Signal control wo 3 S-0-0258 : Target position 4 S-0-0259 : Positioning veloci 5 S-0-0260 : Positioning accel 6 S-0-0359 : Positioning decel 7 S-0-0032 : Bipolar torque/for 8 S-0-0000 : < empty > 9 S-0-0036 : Velocity command 10 ↔	ata channel word rd ty eration eration rce limit value d value

MOTOR, BRAKE, MEASURING SYSTEM SETTINGS:

Motor:

W/Rexroth motor this information will automatically be read from motor by the servo drive:

🖬 IndraWorks Engineering - Motor - Axis [11] CuberCarriage	
<u>File Edit Vi</u> ew <u>P</u> roject <u>Di</u> agnostics <u>T</u> ools <u>W</u> indow <u>H</u> elp	
1월 6월 18 18 19 24 49 - 2월 2월 2월 12 12 12 12 - 2 🙊 🗮 🖼 🔇 199 09 199 199 199 199 - 2	
Im Project Explorer	×
Project1 Axis [11] CuberCarriage HMS01.1 [11] CuberCarriage Image: CuberCarriage	<u>^</u>
Masser communication Motor category Rexreth housing motor	Date of motor dat
Axis [11] CuberCarriage	
😰 — 🔁 Master Communication - Axis 🔰 🛛 2AD100 💌 💌	
Motor, Brake, Measuring Systems	
Motor Company O Rotary O Asynchronous	
Brake Brake	
Brake Check	
DN Name In DB	In drive
Settings of Motor Encoder	
Desition Stude Point	
e — 🛅 Scaling / Mechanical System 🔍	~
	>

W/Non Rexroth motor this information is entered manually (Clamps):

🖥 IndraWorks Engineering - Motor - Axis [55] Depal2 Clamp1									
Ejle Edit View Project Diagnostics Tools Window Help									
[월] 중1 X 🗈 (월) 🕫 🔿 😓 🔜 🔜 [전] 🔟 🛃 🍦 🔶 🏘 📰 🔇 1 M OM I 💷 📾 🖕									
an Project Explorer - 4 × Motor - Axis [55] Depal2 Clamp1 Settings of Motor Encoder - Axis [55] Depal2 Clamp1 Data Referer 4 + ×									
🖃 👘 ClampCuber2 🔼			·						
HMS01.1 [51] Depal2 Carriage	Axis [55] Depaiz Clamp1	•	* • • •	• • •					
HMSULI [53] Depaiz Hoist	Motor category Synchronou	s third-nartu mo	tor 🗸	Date of mol	or database: 3/	/22/2010			
Master Communication									
Power Supply	Motor type CMS71L/B	S/KY/RH1M/9	3B1						
🖃 — 🖨 Axis (55) Depal2 Clamp1		0.13							
🗈 👘 🛅 Master Communication - Axis	- Notaly		lear						
🖹 — 🫅 Motor, Brake, Measuring Systems	Number of pole pairs	3	Pole pairs	Torque/force constant	1.53	Nm/A eff			
Motor	Maximum motor speed	3000.0000	Bom	Direct-avis induct, of motor	11.000	mH			
Reake		05.000			11.000				
Brake Check	Motor peak current	25.000	A ell	Quadrature-axis induct, of motor	14.000	mH			
🕀 💼 Motor Encoder	Motor current at standstill	6.200	A eff	Stator resistance	1.120	Ohm			
🗊 🛁 🕞 Optional Encoder	Nominal motor torque/force	9.500	Nm	Rotor inertia	0.00503	kam²			
Position Switch Point	No	10.000							
🗈 — 🧀 Scaling / Mechanical System	Motor peak torque/force	13.000	INM						
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i LocalI/Os	Coencient		-						
HMS01.1 [57] Depal2 Clamp2									
HMS01.1 [53] Depaiz Pusher									
					EXCELSION B	8			

Motor Temperature Monitoring:

🚡 IndraWorks Engineering - Motor Temperature Monitorin	g - Axis [11] CuberCarriage	
Ele Edit View Project Diagnostics Iools Window Help		
Project Project Master Communication Power Supply Master Communication - Axis Master Communication -	Motor - Axis [11] CuberCarriage Motor Temperature Monitoring - Axis [11] CuberCarriage Axis [11] CuberCarriage 	min s %
Costion Switch Point Scaling / Mechanical System		

W/Rexroth motor this information will automatically be read from motor by the servo drive:

📕 IndraWorks Engineering - Motor Temperature Monit	oring - Axis [55] Depal2 Clamp1	
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an Project Explorer $ extsf{$	al2 Carriage Brake - Axis [55] Depal2 Clamp1 Motor Temperature Monitoring - Axis [55] Depal2 Clamp1	$\bullet \bullet \times$
ClampCuber2	Axis [55] Depal2 Clamp1 Axis [55] Depal2 Clamp1 Motor temperature monitoring Current motor temperature 0.0 °C Therm. time constant of motor 0.0 min Therm. time constant of winding 2.0 s Thermal motor load 0.0 %	

Brake:

W/Rexroth motor this information will automatically be read from motor by the servo drive:



🖬 IndraWorks Engineering - Brake - Axis [55] Depal2 (lamp1	
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17 fil 🗈 🖻 19 9 14 🖡 🏝 🏦 1	l 🔟 🛃 🚽 🚖 🏘 🔜 🤡 PM OM 💷 💷 🖕	
📾 Project Explorer 🛛 👻 🕂 🗙	epal2 Carriage Settings of Motor Encoder - Axis [51] Depal2 C	arriage Brake - Axis [55] Depal2 Clamp1 + ×
HMS01.1 [51] Depal2 Carriage	Axis [55] Depal2 Clamp1 Axis [55] Depal2 Clamp1 Axis [55] Depal2 Cla)
EBo HMS01.1 [55] Depal2 Clamp1	- Configuration - Common	da .
Master Lommunication	Nom load of holding system	SL.
Given Solppy Given Solpping Axis (SS) Depal2 Clamp1 Given Solpping Master Communication - Axis Given Solpping Monter Brake Measuring Sustems	Holding brake type self-holding V	ease holding brake' allowed "Release holding br." allowed via ctrl panel
Motor	Manual o	peration of brake
Motor Temperature Monitori	Delay times	Release Holding Brake
Brake	Drive ON 100 ms	Applu Holding Brake
Brake Uneck Motor Encoder	Drive OFF 100 ms	Apply Holding brake
Index Encoder	Max drive OFE delay time 10 000 ms	Stop Operation Command
Position Switch Point		
🗈 🛁 🛅 Scaling / Mechanical System	Brake current monitoring	
Einit Values	Activate brake current monitoring	
Drive Control		
Error Reaction	Status or brake current monitoring	
Probe		
🗄 — 🫅 Optimization / Commissioning 🧮	1/0 ×31/×32	
⊡ Local I/Os		
HMSU1.1 [57] Depai2 Clamp2		
HMS01.1 [55] Depaiz Fusiter		

Setting of Motor Encoder:

W/Rexroth motor this information will automatically be read from motor by the servo drive:

🖬 IndraWorks Engineering - Settings of Motor Encoder - Axis	: [11] CuberCarriage	
<u>File Edit View Project Diagnostics Tools Window H</u> elp		
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Project Explorer A A Project Explorer A A Project Explorer A A Project Explorer A	11] CuberCarriage Brake - Axis [11] CuberC Axis [11] CuberCarriage Image: CuberCarriage Motor encoder Image: CuberCarriage Motor encoder of MHD, 2AD, ADF motors or GDS Assignment motor enc optional slot X8 (Option 1) : Encoder type Rotational direction inverted Encoder distance-coded Image: Rotary encoder Linear encoder Resolution 256 DP/Rev Encoder gear	arriage Settings of Motor Encoder - Axis [11] Cut + × GDM encoder of Bosch Rexroth Settings of motor encoder Maximum travel range 10 000.0000 mm Multiplication Internal position data format Absolute encoder range 0.0000 mm Absolute encoder evaluation not possible Force absolute encoder evaluation
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	1	

🖬 IndraWorks Engineering - Settings of Motor Encode	r - Axis [55] Depal2 Clamp1			
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📾 Project Explorer 🔷 👻 म् 🗙	Settings of Motor Encoder - Axis [55] D	epal2 Clamp1 Data Reference	e Motor Encoder - Axis (55) Dej	oal2 Cla ◀ ×
ClampCuber2 ClampC	Axis [55] Depal2 Clamp1	Settings of motor encoder Maximum travel range Multiplication Internal position data format Absolute encoder range Absolute encoder evaluation not pr Force absolute encoder evaluation	1000.0000 mm 32 768 4 194 304 3.0000 mm ossible ation	

Data Reference Motor Encoder:

W/Rexroth motor this information will automatically be read from motor by the servo drive:

🖬 IndraWorks Engineering - Data Reference Motor Eng	oder - Axis [51] Depal2 Carriage			
Eile Edit View Project Diagnostics Tools Window	<u>H</u> elp			
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📾 Project Explorer 🛛 👻 म 🗙	eference Motor Encoder - Axis (55) Denal2 Clamp1	ata Beference Motor En	coder - Axis (51) Denal2	Carriage + X
🖃 👘 ClampCuber2 🔥				oumugo
HMS01.1 (51) Depal2 Carriage	Axis [51] Depaiz Carriage 🗸 🗸 🔻 🔻	• • • •		
Master Communication Power Supplu	Reference travel direction	Position	0.0000	
Axis [51] Depal2 Carriage	Positive A	Position feedback value	U.UUUU mm	
😐 — 🦳 Master Communication - Axis	Negative	Reference Distance	0.0000 mm	
😑 — 🛅 Motor, Brake, Measuring Systems	Evaluation of	Homing		
Motor	Reference Mark (Zero Pulse)	Velocity	100.0000 mm/s	
Brake	nositive slope negative slope	Acceleration	100.0000 mm/s ²	
Brake Check	Limit switch as zero switch	FeedBate Override	100.00 %	
🖃 🛁 Motor Encoder	Positive stop as zero switch	Decking by forders	0.1000	
Settings of Motor End	Cam switch point shifted to 0.0000 mm	Position Window	0.1000 mm	
	Home switch offset 0.0000 mm	Jerk limit bipolar	0.0000 mm/s ³	
Position Switch Point	When homing ends	Motor encoder in refer	rence	
🗉 🖳 🚞 Scaling / Mechanical System	O Stop	Sytem reference		
🔒 🦳 Limit Values	O position on reference point	 Motor encoder 	🔘 Optional encoder	
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Gror Reaction				
🛓 🛁 🛅 Drive-Integrated Safety Technolog		Clear position status		
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Deptimization / Commissioning				_
HMS01 1 [53] Denal2 Hoist				
HMS01.1 [55] Depal2 Clamp1				
			123978 CS	

📕 IndraWorks Engineering - Data Reference Motor Enc	oder - Axis [55] Depal2 Clamp1	
File Edit View Project Diagnostics Tools Window H	elp	
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💼 Project Explorer 🔷 🔫 🗙	Data Reference Motor Encoder - Axis [55] Depal2 Clamp1	×
Project Explorer	Data Reference Motor Encoder - Axis [55] Depal2 Clamp1 Axis [55] Depal2 Clamp1 Axis [55] Depal2 Clamp1 Position Positive Positive Negative Evaluation of Homing Reference Mark (Zero Pulse) Home Switch Positive stope scree switch Positive stop as zero switch Cam switch point shifted to Mome Switch of feet When homing ends Stop Position on reference point Offset Offset Offset Output Offset	xdback value 0.0000 mm Distance 0.0000 mm 30.0000 mm/s n 100.0000 mm/s² Dveride 100.00 % indow 0.1000 mm polar 0.0000 mm/s² incoder in reference thereference otor encoder Optional encoder in reference solition status Drive Controlled Homing
HMSULT [57] Depal2 Clamp2		
	1	

SET SCALING/MECHNICAL SYSTEM:

Scaling/Units:

Typical Scaling:

🖬 IndraWorks Engineering - Scaling / Units - Axis [51]	Depal2 Carriage
<u> Eile Edit Vi</u> ew <u>P</u> roject <u>D</u> iagnostics <u>T</u> ools <u>Wi</u> ndow !	telp
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Project Explorer A A HMS01.1 [51] Depal2 Carriage Master Communication Power Supply Axis [51] Depal2 Carriage Master Communication - Axis Motor, Brake, Measuring Systems	1 Depal2 Clamp1 Scaling / Units - Axis [45] Cuber2 Rotation Scaling / Units - Axis [51] Depal2 Carriage Axis [51] Depal2 Carriage
Scaling / Mechanical System Scaling / Units Extended Scaling / Units Extended Mechanical Gear Timt Values Drive Control Direction Modes / Drive Halt Direction Modes / Drive Halt	Scaling not uniform 360.0000 mm Resolution of position data 0.0001 of velocity data 0.0001 mm/s of acceleration data 0.0001 mm/s
	of torque/force data 0.1 % Extended Negation of position, velocity and torque/force data Data with reference to yes Image: Constraint of the second se

Set "Negation of position" to "yes" if there is a need to reverse travel direction.

Scaling for Rotation Axis:

🗟 IndraWorks Engineering - Scaling / Units - Axis [45] Cuber 2 Rotation	\times
<u>File Edit View Project Diagnostics Tools Window</u>		
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🗊 Project Explorer 🗢 🕈 🗙	Depal2 Clamp1 Scaling / Units - Axis [55] Depal2 Clamp1 Scaling / Units - Axis [45] Cuber2 Rotation	×
	IDepal2 Clamp1 Scaling / Units - Axis [5] Depal2 Clamp1 Scaling / Units - Axis [45] Cuber2 Rotation Axis [45] Cuber2 Rotation Image: Scaling type Position data format absolute modulo Scaling not uniform Besolution of position data 0.0001 Degrees of velocity data 0.0001 rad/s² modulo aceleration data 0.0001 regress of torque/force data yes no Negation of position, velocity and torque/force data yes no Negation not uniform Data reference not uniform Data reference not uniform Velocity mitor Action of position Data reference not uniform Data reference not uniform Negation not uniform Negati	

Absolute for non resettable positioning

Modulo for resettable positioning; used in applications like Splitter Flight Bar where there is infinite travel in one direction.

Scaling/Units Extended:

Typical Extended Scaling:



Access parameter S-383 for actual motor temperature.

Scaling/Units Extended:

Rotation Axis Extended Scaling:



Mechanical Gear:

mm to rpm

mm to rad/s2

Carriage Axis (values set using data provided by mechanical engineering):



Mechanical Gear:

Hoist Axis (values set using data provided by mechanical engineering):



Clamp Axis (values set using data provided by mechanical engineering):



If ratio is not a whole number : With a ration of 3.3 to 1 load 33 in n1 and 10 in n2

LIMIT VALUES:

Motion Limit Values:

Typical motion limits:



Typically "Negative position limit value" will be -10. This is the Home position -10.

"Positive position limit value" is determined by moving to the furthest forward position and recording the Actual Position. The axis must be "Homer" before setting Positive Limits for the Actual Position to display the correct value. Drive must be "Disabled" for changes to take effect.

To move to Positive and Negative position for Setting Limits and Homing from a Laptop see next page.

Bipolar jerk limit vale = S ramp

SETTING LIMITS AND HOMING (from Laptop):

This screen is used to move the axis to the Positive and Negative (Home) Position:

🗟 IndraWorks Engineering - Easy Startup Mode - Axi	[55] Depal2 Clamp1	
<u>File Edit View Project Diagnostics Tools Wi</u> ndow	Help	
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📾 Project Explorer 🔹 🕈 🗙	Axis Status - Axis [55] Depal2 Clamp1 Easy Startup Mode - Axis [55] Depal2 Clamp1	×
HMS01.1 [53] Depal2 Hoist	Avis [55] Denal2 Clampt	
Master Communication		
Power Supply	Axis status A0013 Ready for power on	
🖨 🖨 Axis (55) Depal2 Clamp1	Easy startup mode operated via	
Master Communication - Axis Motor, Brake, Measuring Systems	Engineering Port (TCP/IP) Drive enable	
🗉 🔚 Scaling / Mechanical System	Digital inputs Positive rotational direction	
i∎ imit Values	Automatic I/O configuration	
Drive Control Dretation Modes / Drive Halt		
🖬 🔤 Error Reaction	Start Easy Startup Mode	
Probe	Activities and a contraction of the second sec	
Easy Statup Mode		
Command Value Sox	Active actual pos. val. 0.0000 mm	
Drive-Integrated Command	O Gogging O Cmd value input O Motor potentiometr	
 Automatic Setting of Axis Construction Erequency Besponse Analy 		
Axis Sin ulation	Active cmd value U.UUUU mm/s	
🗈 — 🧰 Local I/Os	Jog velocity + 50.0000 mm/s 🥥 Jog +	
	Jog velocity · 50.0000 mm/s 🕥 Jog ·	
HMS01.1 [61] Dep 12 WB		
🗄 🔤 HMS01.1 [41] Cyber2 Carriage 💽	Axis Status	

Engineering Port To take command of Axis click "Start Easy Startup Mode" then click "Enable".

HOMING (from Laptop):

🗟 IndraWorks Engineering - Data Reference Motor Encoder - Ax	is [51] Depal2 Carriage			_ 🗆 🖂
<u>Eile Edit View Project Diagnostics Tools Window Help</u>				
	者 🗄 🍲 🎰 🚃 🚱 РМ ОМ 🕮 🖼 🗉			
Project Evolorer				
	tor Encoder - Axis [55] Depal2 Clamp1 Data Refere	nce Motor Encoder - Ax	is [51] Depal2 Carriage	
HMS01.1 [51] Depal2 Carriage	Axis [51] Depal2 Carriage 🔹 🔹 🔹	- 4 🜒		
Master Communication	Defense have been been	Decker		
Power Supply	Residence travel direction	Position feedback value	0.0000 mm	
🖨 🛶 Axis [51] Depal2 Carriage			0.0000	
🗉 🦳 🛅 Master Communication - Axis	Unvegauve	Heterence Distance	0.0000 mm	
🖨 — 🫅 Motor, Brake, Measuring Systems	Evaluation of	Homing		
Motor	Reference Mark (Zero Pulse)	Velocity	100.0000 mm/s	
Motor Lemperature Monitoring Prake	Home Switch	Acceleration	100.0000 mm/s ²	
Brake Check	Limit switch as zero switch		100.00	
Motor Encoder	Positive stop as zero switch	FeedHate Uverride	100.00 %	
Settings of Motor Encoder	Cam switch point shifted to 0.0000 mm	Position Window	0.1000 mm	
Data Reference Motor Encoder	Home switch offset	Jerk limit bipolar	0.0000 mm/s ³	
🗉 😳 Optional Encoder				
Position Switch Point	When homing ends	🔘 Motor encoder in refer	ence	
🕀 👘 Scaling / Mechanical System		Sytem reference		
Emit Values	o position on reference point	 Motor encoder 	🔘 Optional encoder	
Drive Lontrol	Offset U.UUUU mm	Custom in reference		
		Jystem intererence	_	
Drive-Integrated Safety Technology		Clear position status		
Probe		Drive Con	trolled Homina	
🗉 🛁 🧰 Optimization / Commissioning		Dilve con	arolica i forning	
	J			

With the Axis in the "Home" Position click "Drive Controlled Homing".

Torque/Force Limits:

Typical Force Limits:



Cuber Clamp Force Limits:



Value adjusted for Clamp Cuber Clamp.

*Adjust Hoist Torque/Force limits as low as possible for down travel to limit force available during crash

DRIVE CONTROL / AXIS CONTROL:

GAINS:

Velocity Loop Proportional Gain: The lower the number the tighter the control. Typically proper setting is derived by adjusting the number downward until oscillation is detected then increase the number until oscillation is no longer seen.



Position Loop Proportional Gain: Higher the number the tighter the control. Typically proper setting is derived by adjusting the number upwards until oscillation is detected then lower the number until oscillation is no longer seen.

Axis Control Settings:







Values adjusted for Clamp Cuber Carriage.

Axis Control Settings:







Values adjusted for Clamp Cuber Hoist.

OPERATIONAL MODE / DRIVE HALT:

Typical Operational Modes (controlled positioning = Jog, internal interpolation = auto):

🖪 IndraWorks Engineering - Operation Modes - Axis [5	i1] Depal2 Carriage			
Eile Edit <u>Vi</u> ew Project Diagnostics <u>T</u> ools <u>Wi</u> ndow B	<u>t</u> elp			
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📾 Project Explorer 🛛 👻 🕈 🗙	Operation Modes - A	xis [51] Depal2 Carriage		×
🖃 👘 ClampCuber2	Avia [51] Decelo Camines			
HMS01.1 (51) Depal2 Carriage	Axis [51] Depaiz Carriage	• • • • • •		
Master Communication Power Supplu				
Axis [51] Depal2 Carriage	Primary mode of oper.	Drive-internal interpolation, encoder 1	Configuration	
🔒 — 🫅 Master Communication - Axis				
🖬 🔤 Motor, Brake, Measuring Systems	Second. oper. mode 1	Drive-controlled positioning, encoder 1	Configuration	
🗈 🛁 Scaling / Mechanical System				
Limit Values	🔘 Second. oper. mode 2	Velocity control	Configuration	
Dive Control				
Operation Modes	🔘 Second. oper. mode 3	Velocity control	Configuration	
Drive Halt				
Error Reaction	Second. oper. mode 4	Velocity control	Configuration	
Drive-Integrated Safety Technology Drobe				
Probe Dotimization / Commissioning	Second. oper. mode 5	Velocity control	Configuration	
Local I/Os				
🖬 📕 😝 HMS01.1 [53] Depal2 Hoist	Second oper mode 6	Velocitu control		
HMS01.1 [55] Depal2 Clamp1			Configuration	
HMS01.1 [57] Depai2 Clamp2 HMS01.1 [57] Depai2 Clamp2	Second oper mode 7	Velocity control		
HMS01.1 [03] Depai2 Fusher	Jecona, oper, mode /	Velocity control		
HMS01.1 [41] Cuber2 Carriage				
HMS01.1 [43] Cuber2 Hoist	U Internal secondary oper.	mode		
HMS01.1 [45] Cuber2 Rotation				
HMS01.1 [47] Cuber2 Clamp1				
I HMS01.1 [49] Cuberz Clampz				

Clamp Operational Modes:

🖬 IndraWorks Engineering - Operation Modes - Axis [5	i5] Depal2 Clamp1			
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■ Project Explorer	Operation Modes	Axis [51] Depal2 Carriage Operation Modes - Axi	is [55] Depal2 Clamp1	×
E 🛅 ClampCuber2 B B HMS01.1 [51] Depal2 Carriage	Axis [55] Depal2 Clamp1	• • • • • • • @		
HMS01.1 [53] Depal2 Hoist Master Communication Master Communication	Primary mode of oper.	Drive-internal interpolation, encoder 1	Configuration	
Prower Supply Axis (55) Depal2 Clamp1 Axis (55) Master Communication - Axis	Second. oper. mode 1	Drive-controlled positioning, encoder 1	Configuration	
Motor, Brake, Measuring Systems Galing / Mechanical System	🔘 Second. oper. mode 2	Velocity control	Configuration	
Limit Values Drive Control Deration Modes / Drive Halt	Second. oper. mode 3	Velocity control	Configuration	
Operation Modes Drive Halt	Second. oper. mode 4	Positioning block mode, encoder 1	Configuration	
From Perceining From Probe) Second. oper. mode 5	Positioning block mode, encoder 1	Configuration	
HMS01.1 [57] Depal2 Clamp2) Second. oper. mode 6	Positioning block mode, encoder 1	Configuration	
HMS01.1 [59] Depal2 Pusher HMS01.1 [61] Depal2 WB HMS01.1 [61] Depal2 WB HMS01 1 [41] Cuber2 Carriage) Second. oper. mode 7	Positioning block mode, encoder 1	Configuration	
HMS01.1 [43] Cuber2 Hoist HMS01.1 [45] Cuber2 Rotation HMS01.1 [45] Cuber2 Rotation HMS01.1 [47] Cuber2 Clamp1	 Internal secondary oper. 	mode		
ia III HMS01.1 [49] Cuber2 Clamp2				

SAFETY SETTINGS:



CATION: Decel must be set steep enough to stop axis before safety relay has timed out! Removing power to the safety inputs before the axis has stopped allows the axis to free-wheel to the end of travel.

IndraWorks Engineering - Starting Lockout - Axis [1]	
le Edit View Project Diagnostics Tools Window Help	
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Project Explorer 👻 구	X Starting Lockout - Axis [1]
Project Explorer < 4 Project Host Communication Power Supply Axis [1] Motor, Brake, Measuring Systems Scaling / Mechanical System Limit Values Dirive Control Brite Error Reaction Dirive Integrated Safety Technology Stating Lockout Probe Optimization / Commissioning	X Starting Lockout - Axis [1] Axis [1] ▲ * * * * * * * * * * * * * * * * * * *
	Operating hours power section at last activation 0:00:00
	Operating hours power section at last activation 0:00:00
	Next activation required 168:00:00

SAVING DRIVE PARAMETERS:

🔳 IndraWorks Engineering		
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📾 Project Explorer		# ×
Project1 Master (Power S Axis [11] Axis [11] M D C D X	Switch Offline Switch Online Functional Packages Parameters Firmware Management Delete Del Rename F2 Properties Field Control Field Control Field Control Field Control	 Parameter Editor Parameter Group Saving Loading MMC Settings Creating Operating Data for MMC
	Current Control Open-Loop U/f Control	

Save Parameters
C:\Documents and Settings\gergab\My Documents\CubeClamp2.par
Under 'Parameter selection' determine the parameters which are to be saved. Saving 'all parameters' is only necessary for diagnostic purposes or for subsequently making an offline simulation.
Quick save (only attribute and value)

LOADING PARAMETERS IN MMC CARD:

IndraWorks Engineering	
File Edit View Project HM501.1 Diagnostics To	ils Window Help
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🗊 Project Explorer	→ 1 χ
B - DarpCube1	
HMS01. Parameters	👷 Parameter Editor
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HMS01. Properties	WKC Settings
⊕ — 5 HMS01: ypgroeper campr ⊕ — 5 HMS01: [13] Outer Host ⊕ — 5 HMS01:1 [15] Outer1 Rotation	Greating Operating Data for MMC



APPENDIX:

A: Re-homing After Power Up:

Here is the procedure for sending the actual position to the clamp motors (retained in the PLC), after power-up:

1) Add parameter S-0-0052 to the Ethernet I/P ring. This value will be written to the actual position when you perform the home command on this axis (P-0-4077, bit 2, control word).

Settings - Axis [17] CuberClamp1	
Axis [17] CuberClamp1 🔹 🔹 🔹 🔹 🔹 🔮	
Axis mode Parameterization level 1 is active	
Field bus diagnostic OFFLINE	
Data Channel Real-time input (AT) Real-time output (MDT)	
Profile type Freely configurable mode V Activate profile type	
No. Config list cyclic command data channel	
1 P-0-4077 : Field bus: control word	
2 S-0-0000 : < empty >	
3 S-0-0258 : Target position	
4 S-0-0259 : Positioning velocity	
5 S-0-0260 : Positioning acceleration	
6 S-0-0359 : Positioning deceleration	
7 S-0-0092 : Bipolar torque/force limit value	
8 S-0-0000 : < empty >	
9 S-0-0052 : Reference distance 1	
10	

2) Uncheck all the "Positive stop as zero switch" box. When homing ends select "Stop".

Data Reference Motor Encoder - Axis [17] Cub	erClamp1	This va	alue will
Axis [17] CuberClamp1 🔹 🔺 👻 💎	- 4 🥹	be w	ritten
Direction of motion Clockwise Anti-Clockwise Evaluation of Reference Mark (Zero Pulse) Home Switch opositive slope Limit switch as zero switch Positive stop as zero switch Cam switch point shifted to 0.0000 mm	Position Position feedback value Reference Distance Homing Velocity Acceleration FeedRate Override Position Window	0.0000 0.0000 30.0000 100.0000 100.00 0.1000	mm mm/s mm/s² % mm
Home switch offset 0.0000 mm When homing ends Stop position on reference point Offset 0.0000 mm	Jerk limit bipolar Motor encoder in refer Sytem reference Motor encoder System in reference Clear position status Drive Con	0.0000 ence O Optional e	mm/s ³

B: Scaling Data From Mechanical Engineering:

S Morris Mechanical Data			
Axis	Parameter	Value	Unit
	S-0-0278, Maximum Travel Range	10,000	mm
Carriage	S-0-0123, Feed constant k	500	mm/rev
Carriage	S-0-0121, Input rev of load gear n1	7	
	S-0-0122, Output rev of load gear n2	1	
	S-0-0278, Maximum Travel Range	10,000	mm
Consolidator Carriage	S-0-0123, Feed constant k	500	mm/rev
consolidator carriage	S-0-0121, Input rev of load gear n1	10	
	S-0-0122, Output rev of load gear n2	1	
	S-0-0278, Maximum Travel Range	3000	mm
Hoist	S-0-0123, Feed constant k	500	mm/rev
	S-0-0121, Input rev of load gear n1	30	
	S-0-0122, Output rev of load gear n2	1	
	S-0-0278, Maximum Travel Range	200	Deg
	NO FEED CONSTANT - Rotary System		
Rotate - Rotary Application	S-0-0121, Input rev of load gear n1	<mark>3420</mark>	
	S-0-0122, Output rev of load gear n2	<mark>24</mark>	
Clamps	S-0-0278, Maximum Travel Range	1000	mm
	S-0-0123, Feed constant k	6	mm/rev

Note the new Rotate data based on 114 gear teeth/24 pinion teeth:

	S-0-0121, Input rev of load gear n1	1	
	S-0-0122, Output rev of load gear n2	1	
	S-0-0278, Maximum Travel Range	10000	mm
Marshalling Pusher	S-0-0123, Feed constant k	480	mm/rev
	S-0-0121, Input rev of load gear n1	20	
	S-0-0122, Output rev of load gear n2	1	

C: POWER UP/DOWN SEQUENCE:

To Enable Cuber Servos

From HMI (Panel View) "Servo Drive Screen": Press "Clear Errors" template Press "Enable Power Supply" template Press template for each axis (Carriage, Hoist, ect.)

9.4.5 Time Behaviors When Switching HMV Supply Units ON and OFF

R

Switching On



In the switch-on sequence of the supply unit, the supplying mains is loaded with the current $I_{L_trans_max_on}$ for the purpose of analysis.

During the unloading process, voltage overshoot can occur at the mains components connected in the incoming circuit (e.g. mains filters) due to inductances connected in the incoming circuit, e.g. the leakage inductance of the mains transformer.

With 3 or more HMV supply units at the common supply mains: Switch on supply units one after the other with a time interval of at least 0.5 seconds so that the inrush currents are not added.



See "Rexroth IndraDrive Supply Units and Power Sections" → chapter "Functions and Electrical Connection Points"

Switching Off





POWER SUPPLY DISPLAY STATUS CODES:

Bb = no errors (ready for "Power On")

Lb = "Power On" (buss charged)

DRIVE DISPLAY STATUS CODES:

Bb = "Control Voltage On" and no errors (ready for "Power On").

Ab = "Control Voltage On" and "Power On" (ready for "Drive Enable").

AF = "Control Voltage On", "Power On", and "Drive Enabled" w/Torque waiting for command.

STO = "Safe Torque Off" is enabled (no motion of axis allowed).

DEFINITIONS:

"Control Voltage On" status is achieved by applying 24VDC on terminals 24V and 0V of Power Supply and Servo Drive control section.

"Power On" status is achieved by closing the circuit between terminals 6 and 7 of terminal group X32 on the Servo Drive control section.

"Drive Enable" status is turned on when the PLC writes to the Servo Drive control word P-0-4077 and sets bit 15 to equal 1.

"Safe Torque Off" status is achieved by opening the circuit to terminal 3 and closing the circuit to terminal 2 of terminal group X41 on the Servo Drive control section.

D: TROUBLE SHOOTING

To monitor Drive Status click on "Axis Status".



Axis Status:

🖪 IndraWorks Engineering - Axis Status - Axis [55] De	oal2 Clamp1				
<u>File Edit View Project Depal2 Clamp1 Diagnostics To</u>	ols <u>Wi</u> ndow <u>H</u> elp				
	an an Cara		10710		
	<u>s e e p × ×</u>				
ा Project Explorer 🔹 🕂 🗙	Axis Status - Axis [5	5] Depal2 Clamp1			×
🖃 🚽 🔂 ClampCuber2					
🗄 📱 HMS01.1 [51] Depal2 Carriage	Axis [55] Depal2 Clamp1	🔶 T 💐	•• • •		``
HMS01.1 [53] Depal2 Hoist	Auio number	Auia designatio		Serees address Auis ture	
HMS01.1 [55] Depal2 Clamp1	Axis number	Axis designado		Sercos address Axis type	
Master Communication		Depaiz Ciamj	p1	55 Real axis	
Power Supply Avia (FE) Decedo Classe1	Auia atabua	A0012 Ready for p	ollier op		
Axis (55) Depaiz Clampi	Axis status	Addia Keady for p	lower on		
Master Communication - Axis	Current values				
Scaling / Mechanical Systems	Desilier	0.0000			
Gening / Meenanical System Emit Values	Position	0.0000	mm		-
Drive Control	Velocity	0.0000	mm/s		
🗄 🛁 🔂 Operation Modes / Drive Halt	Acceleration	0.0000	mm/s ²		
🗄 👘 Error Reaction		0.0000			
Probe	Torque / force	0.0	%	Detaile //	
🕀 💼 🕞 Optimization / Commissioning				Decails (
🗉 🛁 Local I/Os	Motion		Status		
🗄 📱 HMS01.1 [57] Depal2 Clamp2			Ontrol se	ection ready for oper. (bb)	_
🗄 🔤 HMS01.1 [59] Depal2 Pusher		not activo	🔘 Ctrl and p	ower sections ready for op. (Ab)	
■ HMS01.1 [61] Depal2 WB		noc accire	🔵 Drive with	n torque (AF)	
HMS01.1 [41] Cuber2 Carriage			🔘 Drive HAL	LT active (AH)	
HMS01.1 [43] Cuber2 Hoist			Drive erro	or	
HMSUI.1 [45] Luber2 Hotation	Messages				
HMS01.1 [47] Luber2 Clamp1	🔘 n actual = 0	○ P >= Px	🔘 In Position	n	~
	1	-			

Typical Drive Fault Codes and causes:

F2060 – "Under Voltage In Power Section": Typically caused by enabling Drives with Power Section off or with 3 Phase Supply off.

F2028 – "Excessive Deviation": Accel or Decel set to high or mechanical problem.

F2174 – "Loss of Motor Encoder": Clear position status, then set absolute measure (home), then cycle power.

F2802 = unable to "Power On" due to drive error

F3131 – "Error when checking Input Signals": Check Safety wiring at Drive Inputs X41.

F4005 – "Error during phase regression": Ethernet IP error.

F4009 - "Bus Failure"

F6029 – "Positive Position Limit Exceeded": The axis has traveled beyond programmed limits. Clear error then Enable Power Supply, then enable the Drive, then give a command value that calls for a move to a location that is within programmed travel limits.

F6030 – "Negative Position Limit Exceeded": The axis has traveled beyond programmed limits. Clear error then Enable Power Supply, then enable the Drive, then give a command value that calls for a move to a location that is within programmed travel limits.

F8022 – "Encoder Signal Incorrect": The encoder cable may be defective. Less likely cause is defective Drive Control Section. Move axis with caution after this fault as the axis may need to be re-homed. This error (after the problem has been corrected) must be cleared in "Parameter Mode" from the Indaworks software or from the Drive Keypad with the Power Supply Off.

F8023 – "Mechanical Link W/Encoder": Caused by loose of connection between Encoder and Drive Control Section. Power Supply must be Off to clear error after problem has been corrected.

F8027 – "Drive Enable With Safe Off": Caused by attempting to enable drive with Safe Off mode enabled.

F8060 – "Over current in Power Section": Typically caused by short in motor or motor cable. If motor and cable are OK Drive Control Unit may be defective. Test by disconnecting motor and see if fault clears. If not disconnect cable from Drive Power Section (A1,A2,A3) and see if fault clears.

F8260 – "Torque/Force command value limit active": Can be caused by Torque/Force limits set to low or the axis has crashed into something.

REFER TO INDRAWORKS HELP FOR ADDITIONAL FAULT CODES INFORMATION AS SHOWN ON NEXT PAGE:



Choose "Troubleshooting Guide":



Choose "Error Messages":



Choose appropriate category below:



E: CONTROL WORD DEFINITIONS

P-0-4077,	Field bus:	control	word	(PLC to	Drive)	

<image/> <image/>	-4077 Field Bus Control V lit View Document Tools V	Word.pdf - Adob Window Help	e Reader		
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Image: height of height		Structure			
		Bit	Designation/function	Comment	
		0	Command value acceptance Upon a change (5-0-0345, bit 0) - a positioning block is activated or - the command position is accepted	Not supported in profile 0xFFFD (see <u>P-0-4084</u>)	
2 0 <t< td=""><td></td><td>1</td><td>Operating mode setting 0->1: Change to operating mode 1->0: Change to parameter mode</td><td></td><td></td></t<>		1	Operating mode setting 0->1: Change to operating mode 1->0: Change to parameter mode		
3 Advantar / relative (S=0-0346, bit 3) (only effective when using the properties of the pro		2	Going to zero (<u>S-0-0148</u>) 0->1: Start homing command "C6" 1->0: Complete homing command "C6"	Not supported in profile 0xFFFD (see <u>P-0-4084</u>)	
4 Immediate block change (S=0.0282) is only applied after the last active target position was reached bot supported in profile SFFD (see P=0.4094) 5 Obstroning command value (S=0.0282) is only applied after the last active target position was reached i. Positioning command value (S=0.0282) is immediately applied upon targeting or ommand value (S=0.0282) is immediately applied upon targeting or command value (S=0.0283) is only applied after the last active target formed eating command value (S=0.0282) is immediately applied upon targeting or ommand value (S=0.0283) is only applied after the last active target formed eating command value (S=0.0286) is S=0.0236, bit 1) 6 Destroning / Jogging (S=0.036, bit 2 + S=0.036, bit 1) For supported in profile Definition (S=0.0282) is immediately applied upon targeting of the support target in profile Definition and the support of the suport of the support of the		3	Absolute / relative (<u>S-0-0346</u> , bit 3) (only effective when using " <u>S-0-0282</u> , Positioning command value") 0: Positioning command value (<u>S-0-0282</u>) is processed as absolute target position in the drive 1: Positioning command value (<u>S-0-0282</u>) is processed as relative travel distance in the drive	Not supported in profile 0xFFFD (see <u>P-0-4084</u>)	
5 Clear error (5:0-0092) 0-31: State error (scing command "CS" 1-30: Complete command "CS" 7/6 Positioning (Jogdis, bit 2 + 5:0-0346, bit 1) 0: Positioning activated by: 0: Positioning activate a		4	$\label{eq:starting} \begin{array}{ c c c c c c c c c $	Not supported in profile 0xFFFD (see <u>P-0-4084</u>)	
7/6 Positioning / jogging (5:0-0.346, bit 2 + 5:0-0.346, bit 1) Not supported in profile 00: Positioning active, start at change of bit 0 Positioning active, start at change of bit 0 Not supported in profile 01: Infinite travel in positive direction (100+) 10: Infinite travel in positive direction (100+) Not supported in profile 02: Scondary oper. mode 1 (e.g., jogging) 11: Stopping the axis (positioning atop Not supported in profile 03: Scondary oper. mode 2 11: Stopping the axis (positioning atop Not supported in profile 10: Infinite travel in positive direction (100+) 11: Stopping the axis (positioning atop Not supported in profile 11: Scondary oper. mode 1 (e.g., jogging) 11: Stopping the axis (positioning atop Not supported in profile 12: Drive start Interpolator clock (only in cycl. pos. control): Toggles when new command values transmitted Not supported in profile 13: Drive Hatt (10-00116, bit13) Drive tart Interpolator clock (only in cycl. pos. control): supported in profile 14: Drive enable (10-0-0116, bit14) Independent of P-0-0116, bit15) Drive tart Internally as soon as field bus communication is active! 15: Drive enable I-0: Dissible deceleration according to P-0-0119 P-0-4077, bit 14 of P-0-0116, bit13 P-0-4077, bit 14 of P-0-0116, bit14 10: Drive		5	Clear error (<u>5-0-0099</u>) 0->1: Start error clearing command "C5" 1->0: Complete command "C5"		
9/8 Command operation mode (for SERCOS: <u>S-0-0134</u> , bit 89) 00: Primary operation mode 01: Secondary oper. mode 1 (e.g., jogging) 10: Secondary oper. mode 2 11 Interpolator clock (only in cycl. pos. control): Toggles when new command values transmitted 13 Drive Halt (<u>P-00116</u> , bit13) 0-31: Drive statt 1-30: Drive Halt (<u>P-00116</u> , bit14) 1-30: Drive Halt (<u>P-00116</u> , bit14) 1-30: Drive Halt (<u>P-00116</u> , bit14) 1-30: Drive that resett) 14 Interpolator clock (0.000 (P-0-0116) bit 14 of <u>P-00116</u> is automatically set internally as soon as field bus communication is active! 15 D-31: Drive enable 1-30: Best possible deceleration according to <u>P-0-0119</u> P-0-4077, Field bus: Control word Rearonter mustn't be parameterized simultaneously with " <u>P-0-4068</u> , Field bus: Control word IO" in " <u>P-0-4081</u> , Field bus: Config. list of cyclic command value data ch.". P-0-4077 - Attributes [®] Re-a78862987ffc03440a6846a0019d1015-1-en-US-6		7/6	Positioning / jogging (<u>5-0-0346</u> , bit 2 + <u>5-0-0346</u> , bit 1) Positioning activated by: 00: Positioning active, start at change of bit 0 Positioning aborted by: 01: Infinite travel in positive direction (jog+) 10: Infinite travel in negative direction (jog-) 11: Stopping the axis (positioning stop)	Net supported in profile 0xFFFD (see <u>P-0-4084</u>)	
12 IPOSYNC Interpolator clock (only in cycl. pos. control): Toggles when new command values transmitted 13 Drive that (P-0-0116, bit13) 0->1: Drive statt 1->0: Drive that (P-0-0116, bit14) Independent of P-0-4077, bit 4 of P-0-0116 is automatically set internally as soon as field bus communication is active! 14 Drive on ble (P-0-0116, bit15) 0->1: Drive on able 1->0: Best possible deceleration according to P-0-0119 F-0-4077, Field bus: Control word Image: The parameter musth the parameterized simultaneously with "P=0=4068, Field bus: Control word 10" in "P=0-4081, Field bus: Config. list of cyclic command value data ch.". P-0-4077 - Attributes To (*) Rexroth 2009 RS-a78d62987ffc03440a6846a0019d1015-1-en-US-6		9/8	Command operation mode (for SERCOS: <u>S-0-0134</u> , bit 89) 00: Primary operation mode 01: Secondary oper. mode 1 (e.g., jogging) 10: Secondary oper. mode 2 11: Secondary oper. mode 3		
13 Drive Halt (P-0-0116, bit13) 0-31: Drive start 1->0: Drive Halt, i.e. the drive is immediately shut down (speed command value reset!) 14 Drive enable (P-0-0116, bit14) Independent of P-0-4077, bit 14 of P-0-0116 is automatically set internally as soon as field bus communication is active! 15 Drive oN (P-0-0116, bit15) 0->1: Drive enable 1->0: Best possible deceleration according to P-0-0119 P-0-4077, Field bus: Control word Image: The parameter mustn't be parameterized simultaneously with "P=0=4068, Field bus: Control word 10" in "P=0=4081, Field bus: Config. list of cyclic command value data ch.". P-0-4077 - Attributes *> © Rexroth 2009 RS-a78d62987ffc03440a6846a0019d1015-1-en-US-6		12	IPOSYNC Interpolator clock (only in cycl. pos. control): Toggles when new command values transmitted		
14 Drive enable (P-0-0116, bit14) Independent of P-0-4077, bit 14 of P-0-0116 is automatically set internally as soon as field bus communication is active! 15 Drive ON (P-0-0116, bit15) 0->1: Drive enable 1->0: Best possible deceleration according to P-0-0119 P-0-4077, Field bus: Control word Image: Set possible deceleration according. Iso for cyclic command value data ch.". P-0-4077 - Attributes © Rexroth 2009 RS-a78d62987ffc03440a6846a0019d1015-1-en-US-6		13	Drive Halt (P-0-0116, bit13) 0->1: Drive start 1->0: Drive Halt, i.e. the drive is immediately shut down (speed command value reset!)		
15 Drive ON (P-0-0116, bit15) 0->1: Drive enable 1->0: Best possible deceleration according to P-0-0119 P-0-4077, Field bus: Control word Image: The parameter musth't be parameterized simultaneously with "P=0=4068, Field bus: Control word Io" in "P=0=4081, Field bus: Config. list of cyclic command value data ch.". P-0-4077 - Attributes > © Rexroth 2009 RS-a78d62987ffc03440a6846a0019d1015-1-en-US-6		14	Drive enable (<u>P-0-0116</u> , bit14) Independent of P-0-4077, bit 14 of <u>P-0-0116</u> is automatically set internally as soon as field bus communication is active!		
P-0-4077, Field bus: Control word Image: The parameter musta't be parameterized simultaneously with "P=0=4068, Field bus: Control word IO" in "P=0=4081, Field bus: Config. list of cyclic command value data ch.". P-0-4077 - Attributes % © Rexroth 2009 RS-a78d62987ffc03440a6846a0019d1015-1-en-US-6		15	Drive ON (<u>P-0-0116</u> , bit15) 0->1: Drive enable 1->0: Best possible deceleration according to <u>P-0-0119</u>		
The parameter mustn't be parameterized simultaneously with "P=0=4068, Field bus: Control word IO" in "P=0=4081, Field bus: Config. list of cyclic command value data ch.". P=0-4077 - Attributes *> © Rexroth 2009 RS-a78d62987ffc03440a6846a0019d1015-1-en-US-6		P-0-4077	, Field bus: Control word		
P-0-4077 - Attributes © Rexroth 2009 RS-a78d62987ffc03440a6846a0019d1015-1-en-US-6		167	The parameter mustn't be parameterized simultaneously with " <u>P=0=40</u> word IO" in " <u>P=0=4081</u> , Field bus: Config. list of cyclic command value	168, Field bus: Control e data ch.".	
© Rexroth 2009 RS-a78d62987ffc03440a6846a0019d1015-1-en-US-6		P-0-4077	- Attributes To		
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Structur The indivi	e idual bits of the parameter have the following significance:	
Bit	Designation/function	Comment
1/0	Operating mode acknowledgment 10: Operating mode 01: No longer relevant as of MP*04VRS 00:Parameter mode	As of MP*04VRS implementation of a sep. parameterization state machine
2	In reference (status of reference encoder) (<u>5-0-0403</u> , bit 0) actual position value (encoder 1 or 2) is 0: Relative 1: Homed	
3	In standstill ($\underline{S-0-0331}$, bit 0) 1: Actual velocity $ \leq \text{standstill window} \underline{S-0-00401} \leq \underline{S-0-0124}$	
4	Command value reached for Velocity control 1: Command speed reached (<u>5-0-0330</u> , bit 0) Cyclic position (<u>5-0-0336</u> , bit 0) Drive-internal interpolation 1: [(<u>5-0-0258</u>) - (<u>5-0-0051</u> /53)] Drive-controlled positioning 1: [(<u>5-0-0430</u>) - (<u>5-0-0051</u> /53)] Drive-controlled positioning 1: [(<u>5-0-0430</u>) - (<u>5-0-051</u> /53)] Drive-controlled positioning 1: [(<u>5-0-0430</u>) - (<u>5-0-051</u> /53)] Drive-controlled positioning 1: [(<u>5-0-0430</u>) - (<u>5-0-051</u> /53)] Drive-controlled positioning 1: [(<u>5-0-0430</u>) - (<u>5-0-0051</u> /53)] Drive-present (<u>5-0-031</u>) Prove controlled position (<u>5-0-0057</u> and "in position" (<u>5-0-0372</u> , bit 2) Positioning block mode 1: "End position reached" (<u>P-0-4061</u> , bit 4) Other operation modes: 1. "Target position attained" (<u>5-0-0342</u> , bit 0)	
5	Command change bit 1: If command status has changed 0: If command status has not changed	
6	Operating mode error 1: Error in transition command 0: No error in transition command	
7	Status of command value processing 1: Drive does not follow command value input (e.g., when Drive Halt is active) 0: Drive follows command value input (e.g., "AF" active)	
9/8	Actual operation mode (<u>P-0-0116</u> , bit 89) 00: Primary operation mode	
	01: Secondary oper. mode 1 10: Secondary oper. mode 2 11: Secondary oper. mode 3	
10	Command value acknowledgment By toggling the bit (<u>S-0-0419</u> , bit 0), the drive acknowledges the acceptance of the "positioning command value" (<u>S-0-0282</u>).	
11	Class 3 diagnostics message (cf. <u>S-0-0013</u>) The bit is set if a class 3 diagnostics message is present.	
12	Class 2 diagnostics warning (cf. <u>S-0-0012</u>) The bit is set if a class 2 diagnostics warning is present.	
13	Class 1 diagnostics drive error (cf. <u>S-0-0011</u>) The bit is set if a class 1 diagnostics error is present (drive interlock).	
15/14	Ready for operation (P-0-0116, bit 14/15) 00: Not ready for power on (e.g. "P2") 01: Ready for power on ("bb") 10: Cartical parties are section made for an ("Ab")	

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