

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 as follows:



PRESS AND HOLD THE "ESC" AND "ENTER" BUTTON AT THE SAME TIME UNTIL THE DISPLAY STARTS TO BLINK (ABOUT 8 SECONDS) . When the display blinks then the Drive will allow you to change parameters>

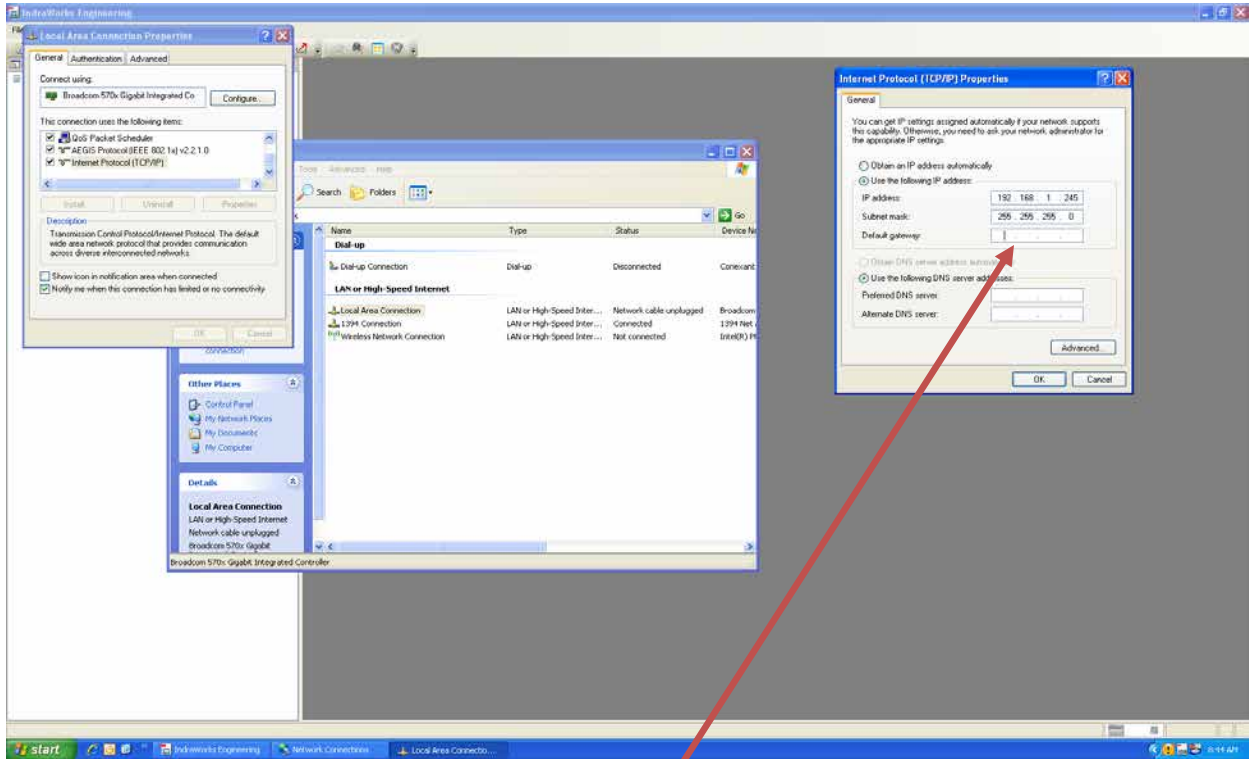
With the display blinking the servo drive indicates it is in program mode. Access the parameter below to enter the IP Address.



- 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:

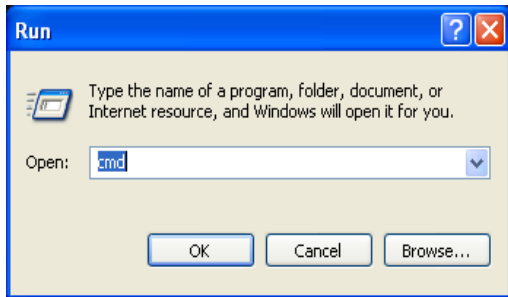
TO SET UP LAPTOP IP ADDRESS:



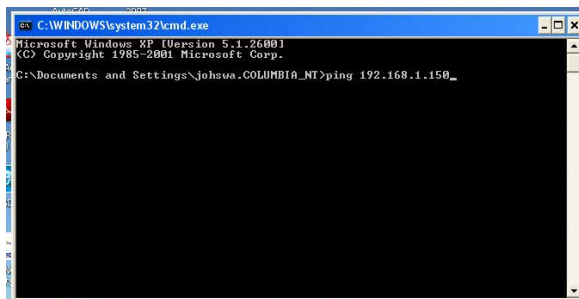
Typical "Internet Protocol Properties" for communication to Drive.

TO PING THE DRIVE:

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

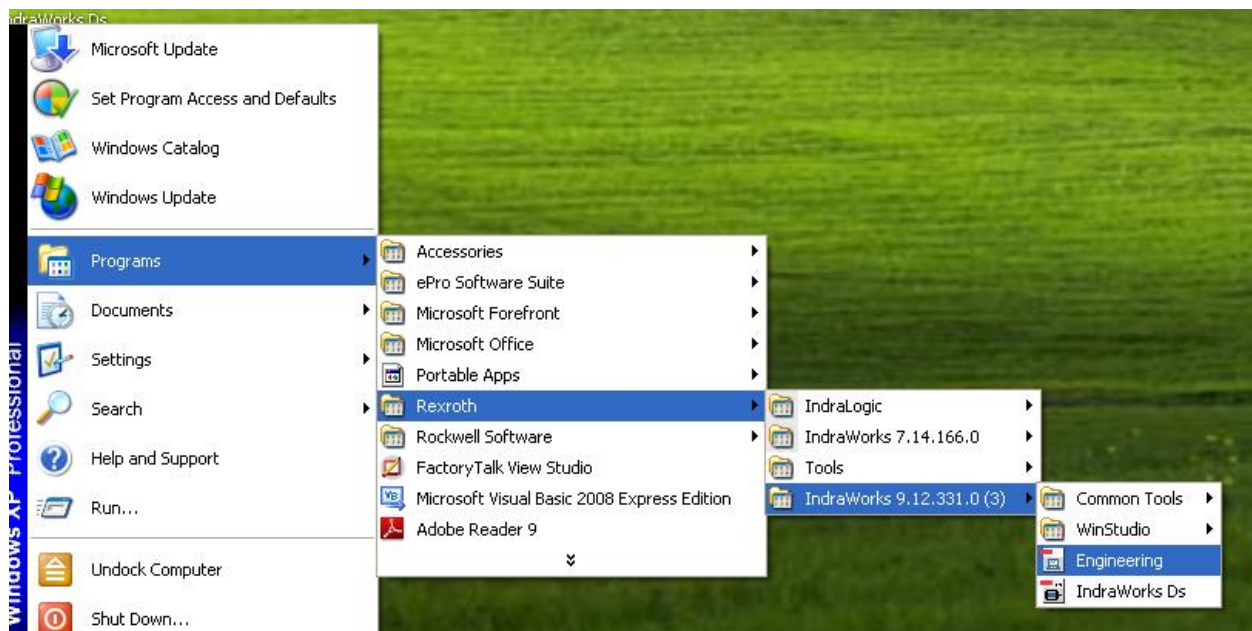


Type PING then enter the drive Ethernet address and hit enter.

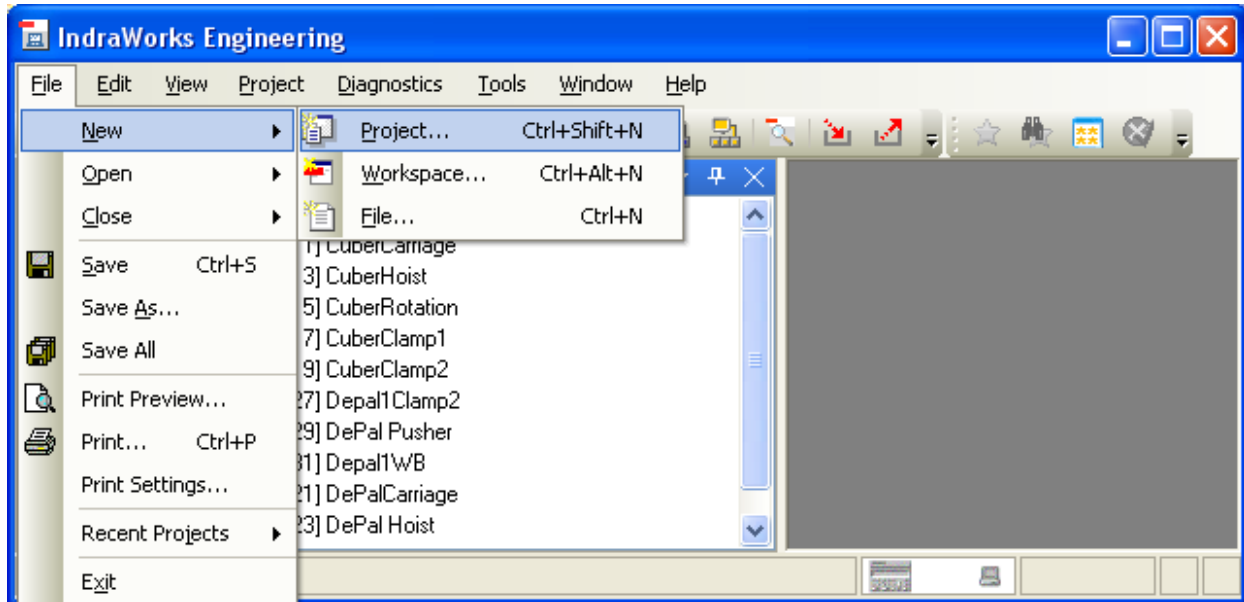


3.0 START REXROTH INDRAWORKS SOFTWARE:

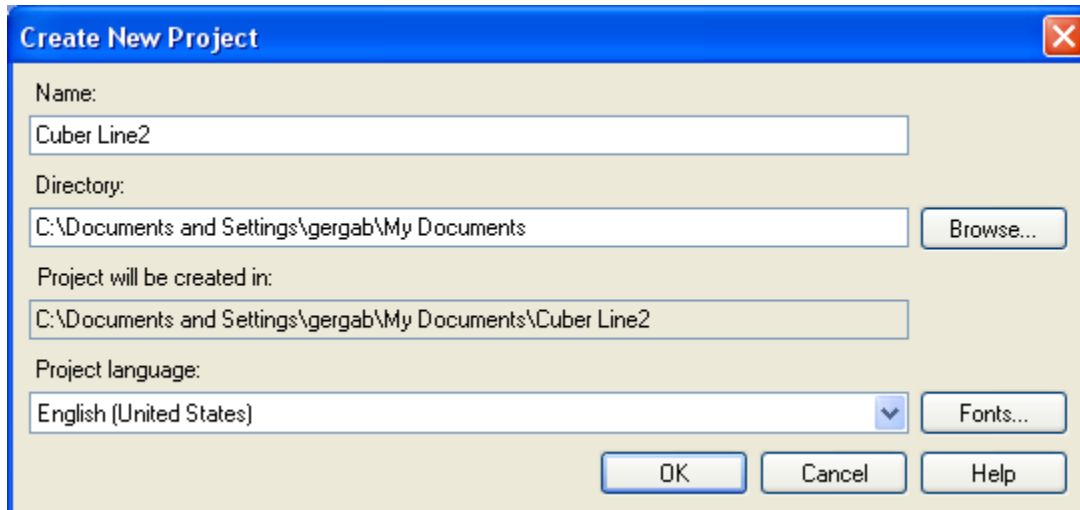
- Use latest version **9.12.331.0**. From Windows Start Menu See path below:



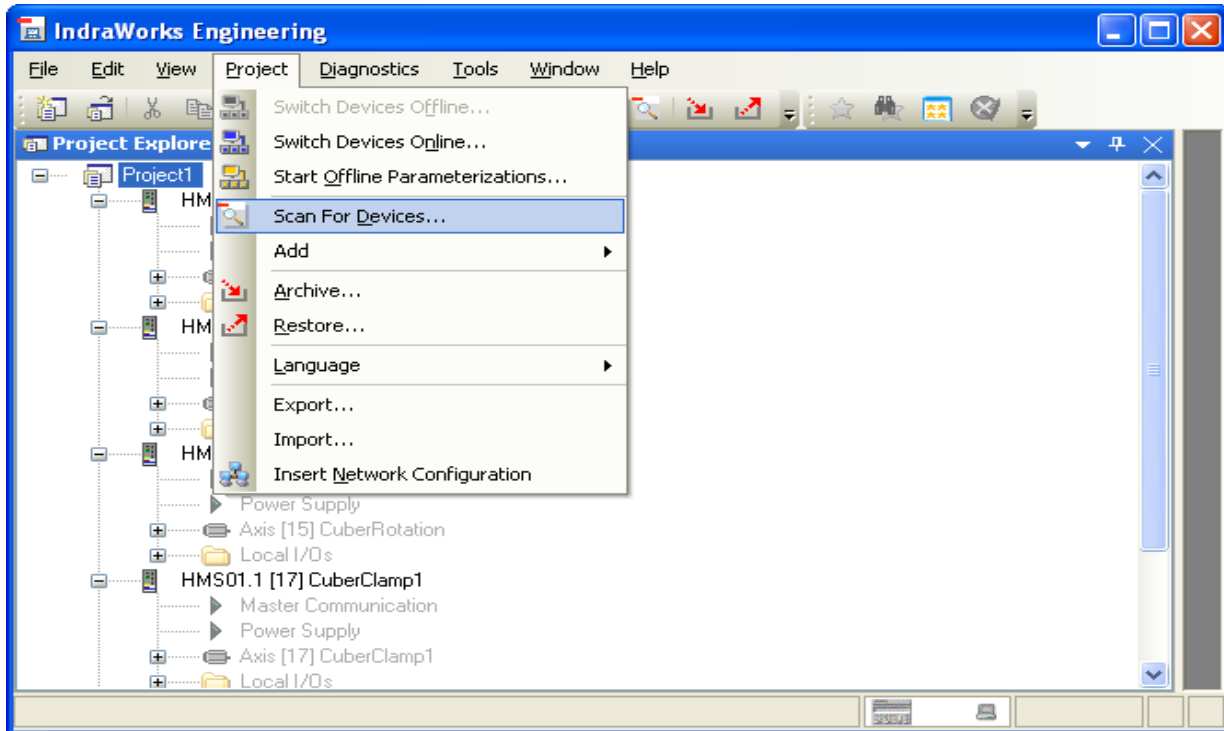
Start a new project:



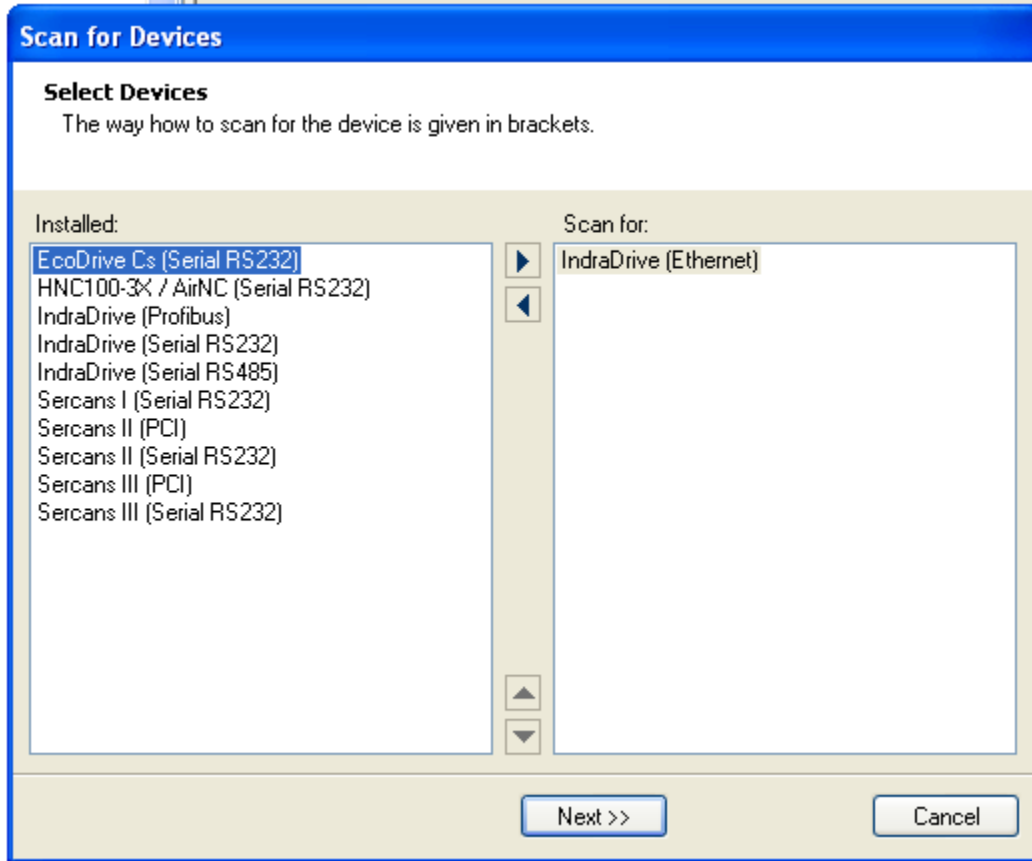
Enter project name:



- FROM REXROTH SOFTWARE, IN THE PROJECTS MENU, **SCAN FOR DEVICES**;



- Choose “IndraDrive (Ethernet)”:



- Enter IP address of Drives to be Scanned:

Scan for Devices

Device: IndraDrive (Ethernet)
Select IP address and IP port.

IP Address
The maximum value for an IP address is 255.255.255.255.

From: 192.168.1.142

To: 192.168.1.143

IP Port
The possible values for an IP port are between 0 and 65535.

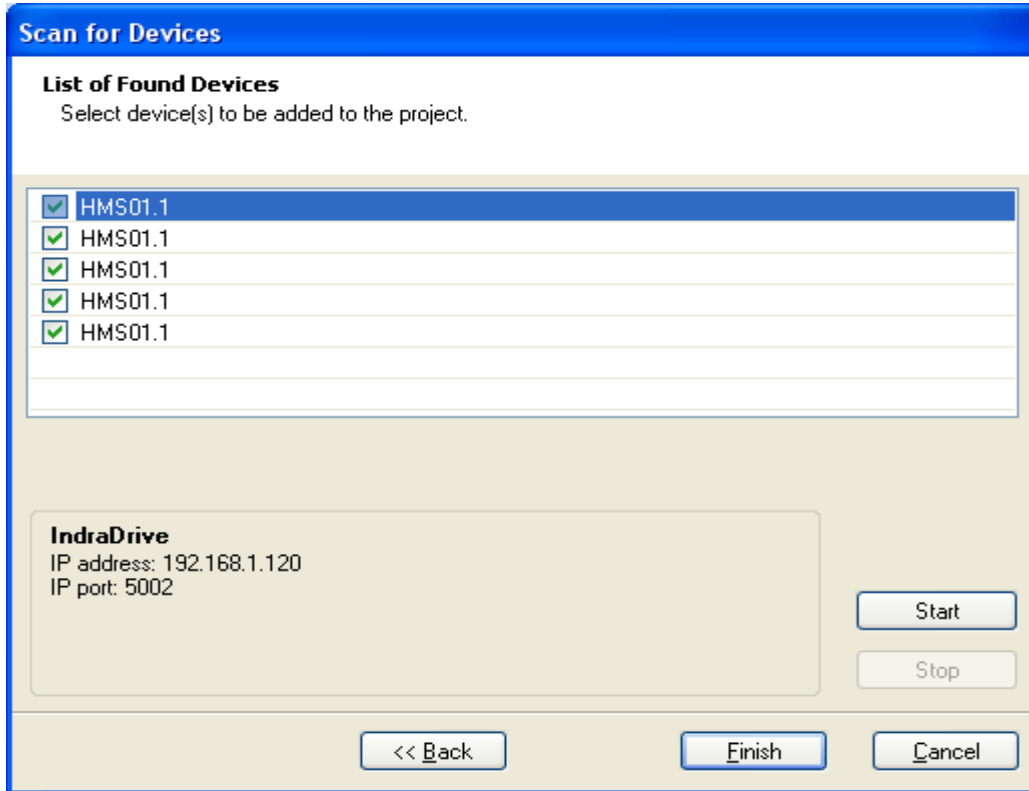
From: 5002

To:

Advanced...
Default

<< Back Next >> Cancel

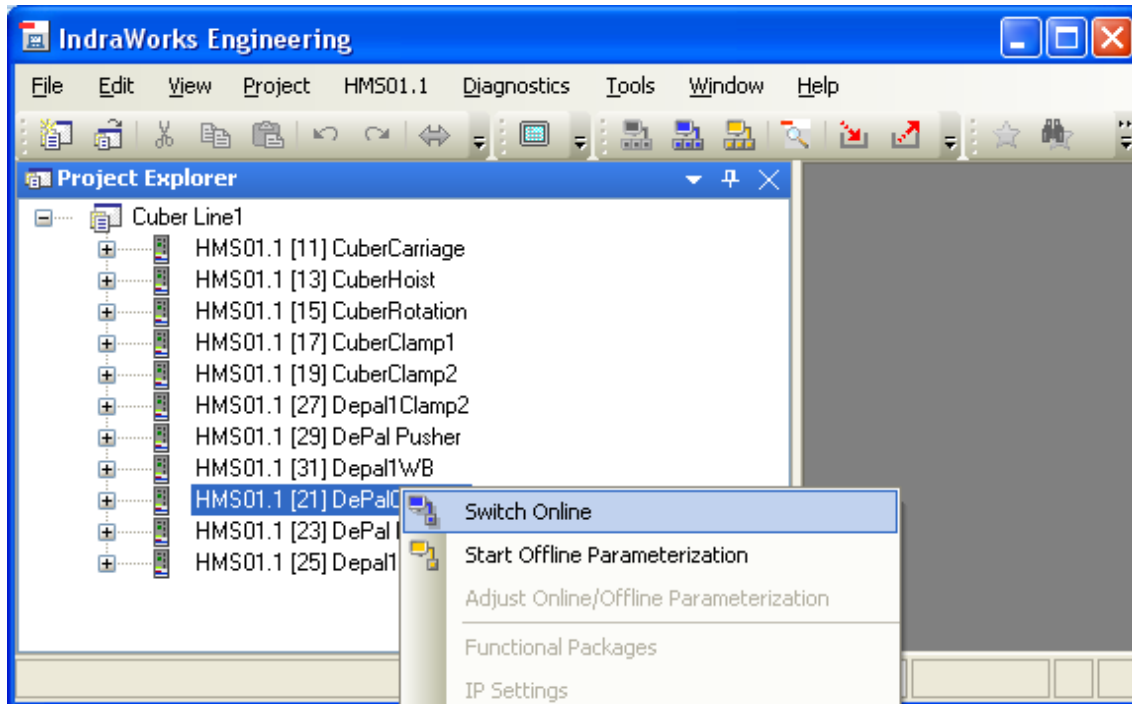
Drives that are online will show up in the dialog box below:



Project screen with showing all drives in the system:

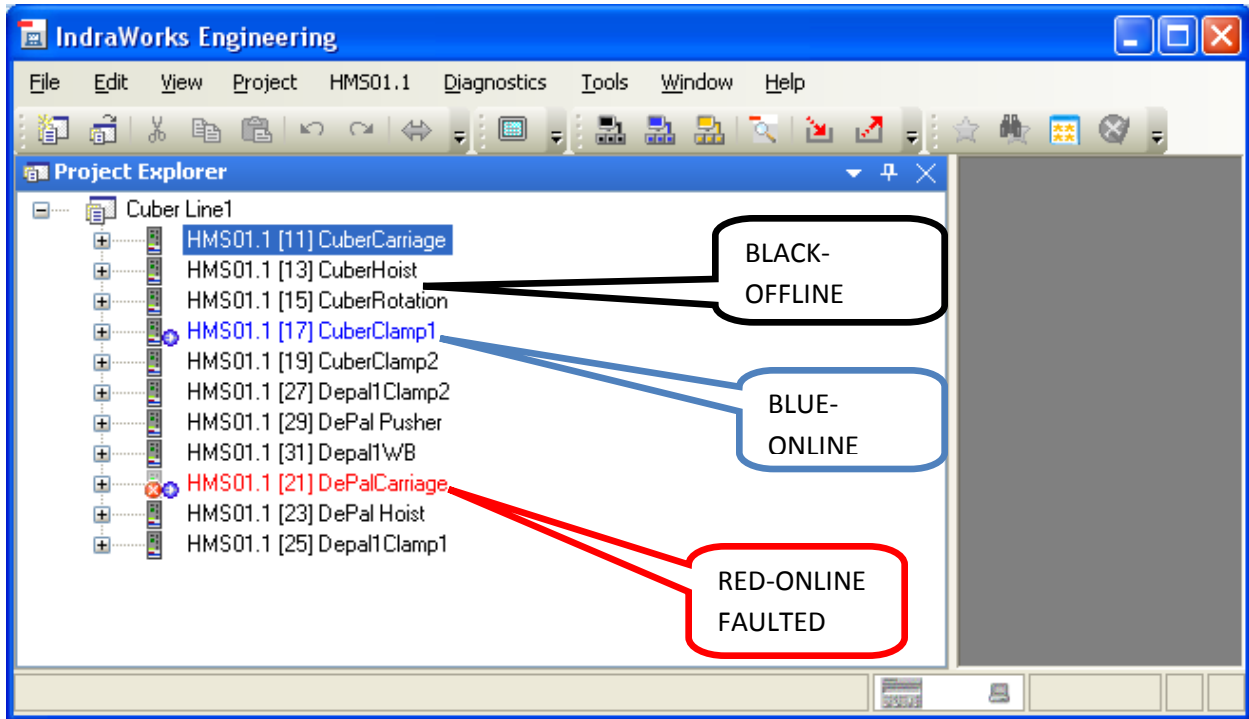
To get online with a particular drive, highlight the particular drive desired and do the following:

Right click on the drive and select “Switch Online”.



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.



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.

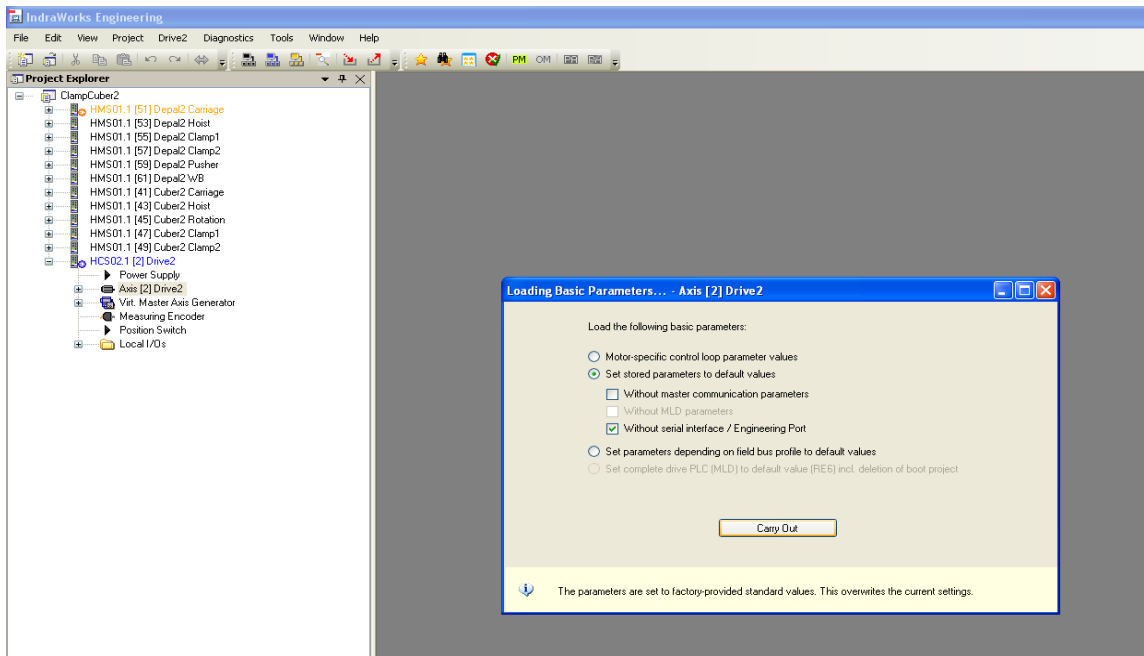
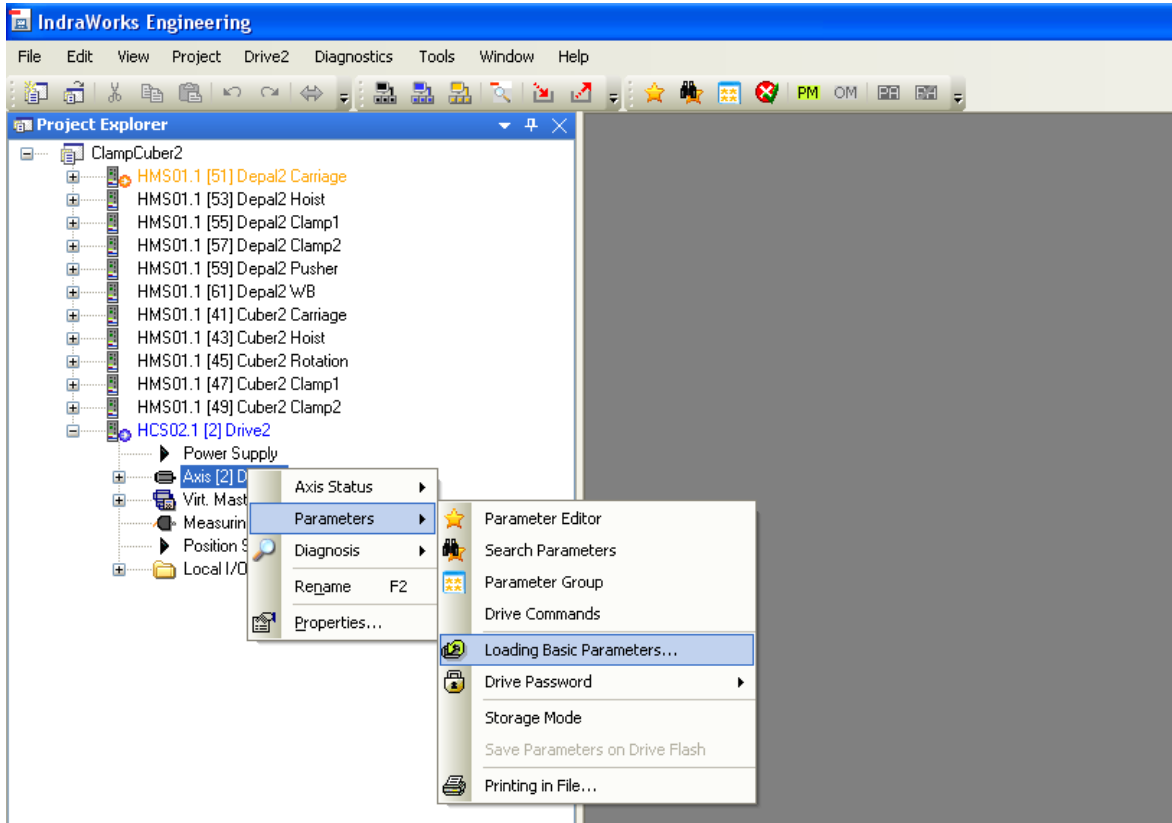
BLUE – Drive is ONLINE HAPPY with no FAULTS.

RED – Drive is ONLINE and a FAULT EXISTS.

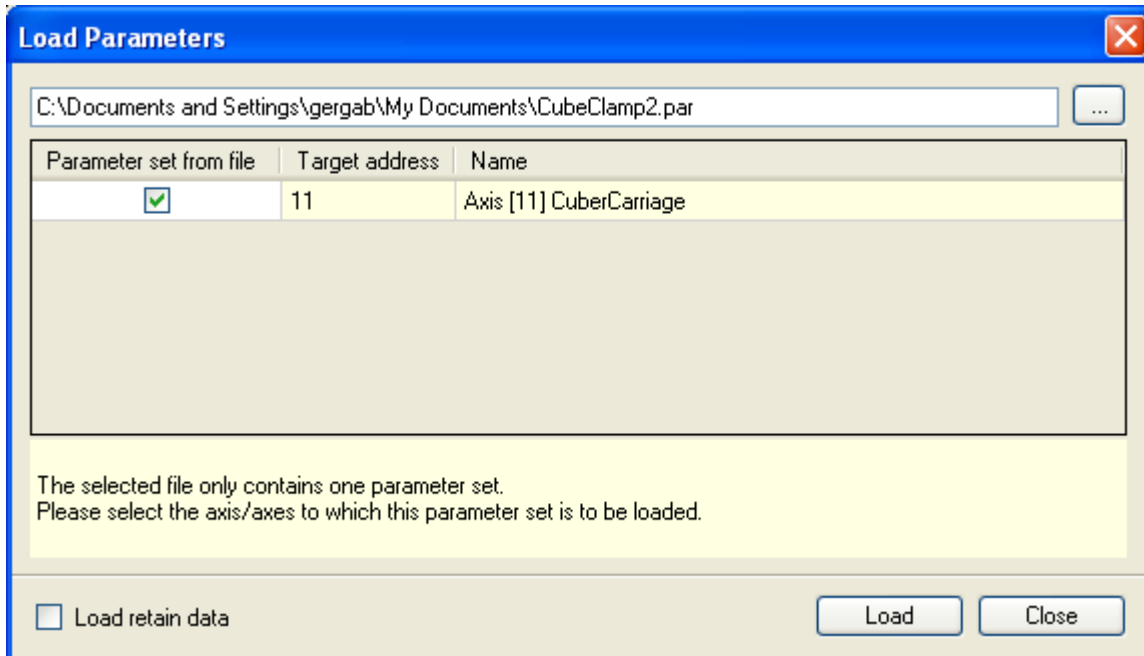
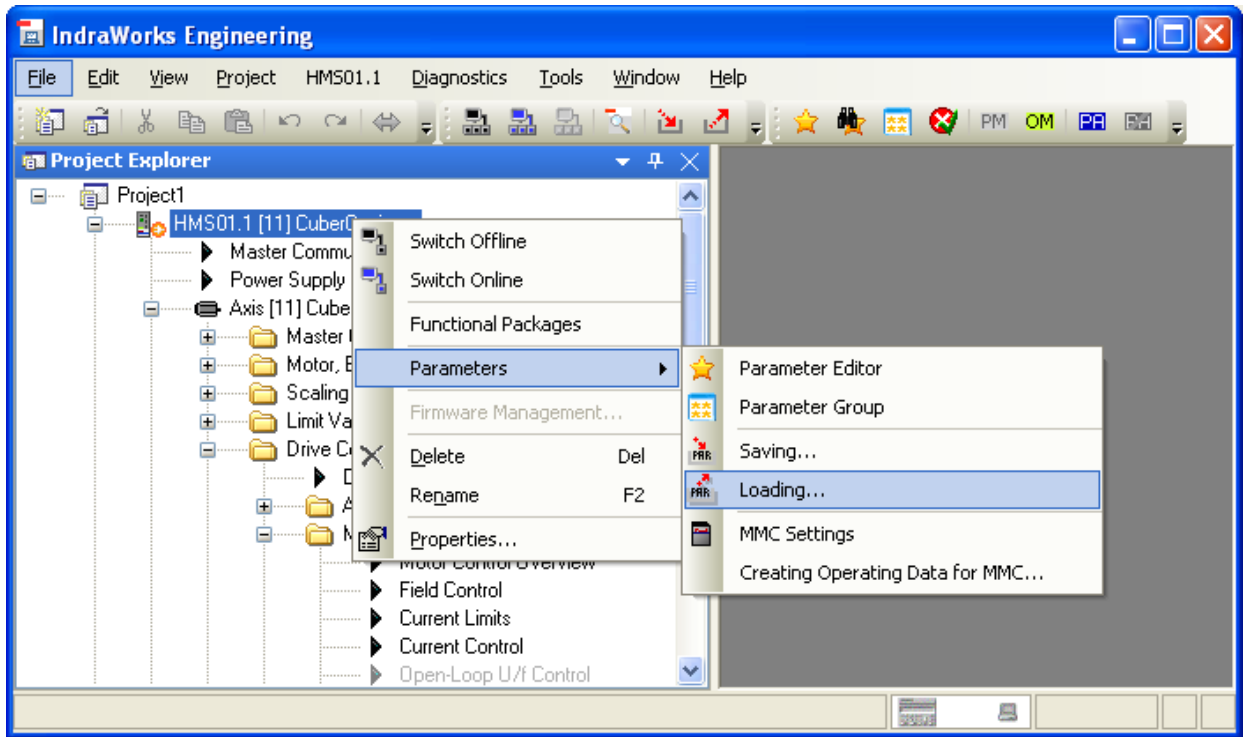
ORANGE – Drive is in OFFLINE PARAMETERIZATION mode (not shown above).

4.0 LOAD DEFAULT DRIVE PARAMETERS:

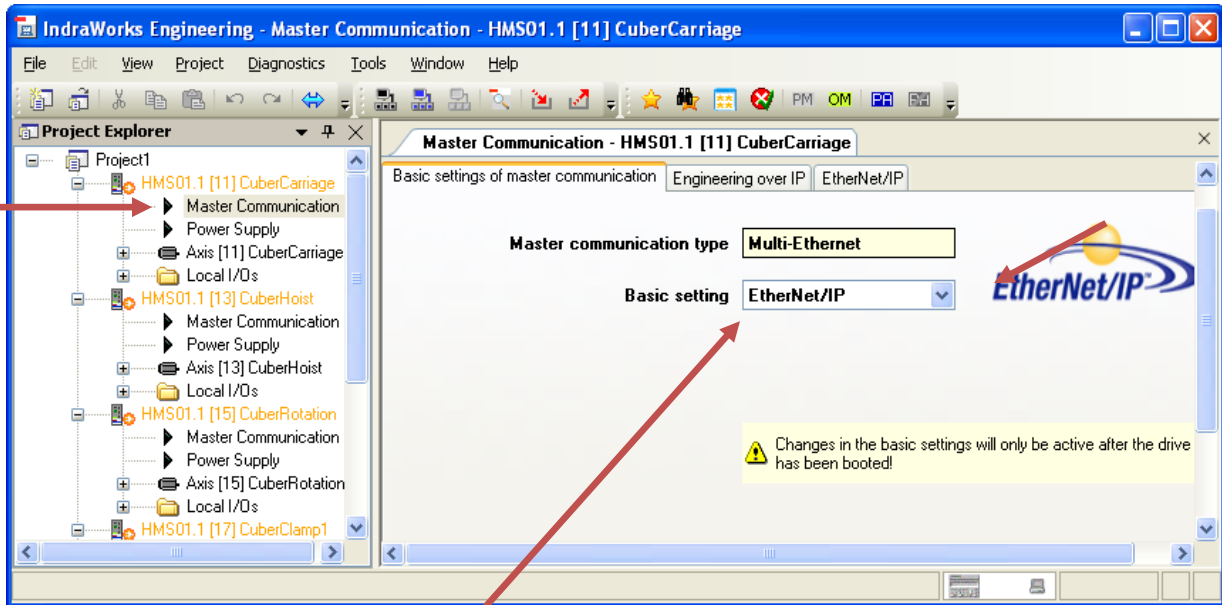
This is done to clear the memory to assure a clean start on the project



LOAD DRIVE PARAMETERS FROM EXISTING PROJECT:

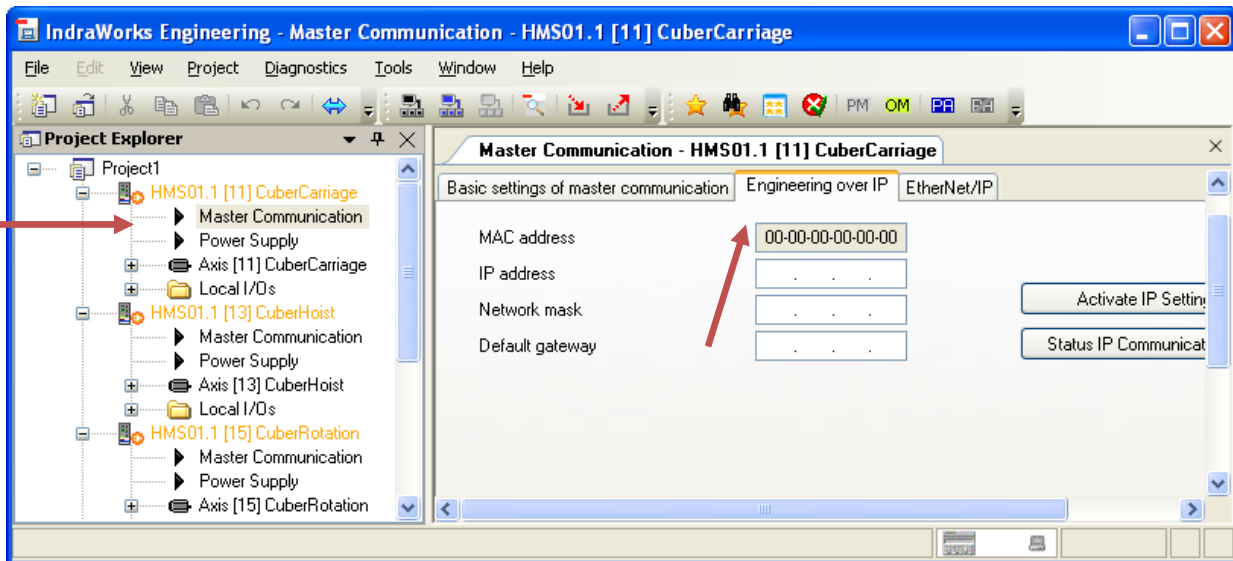


Set System Communication Protocol from “Master Communication” project tree:

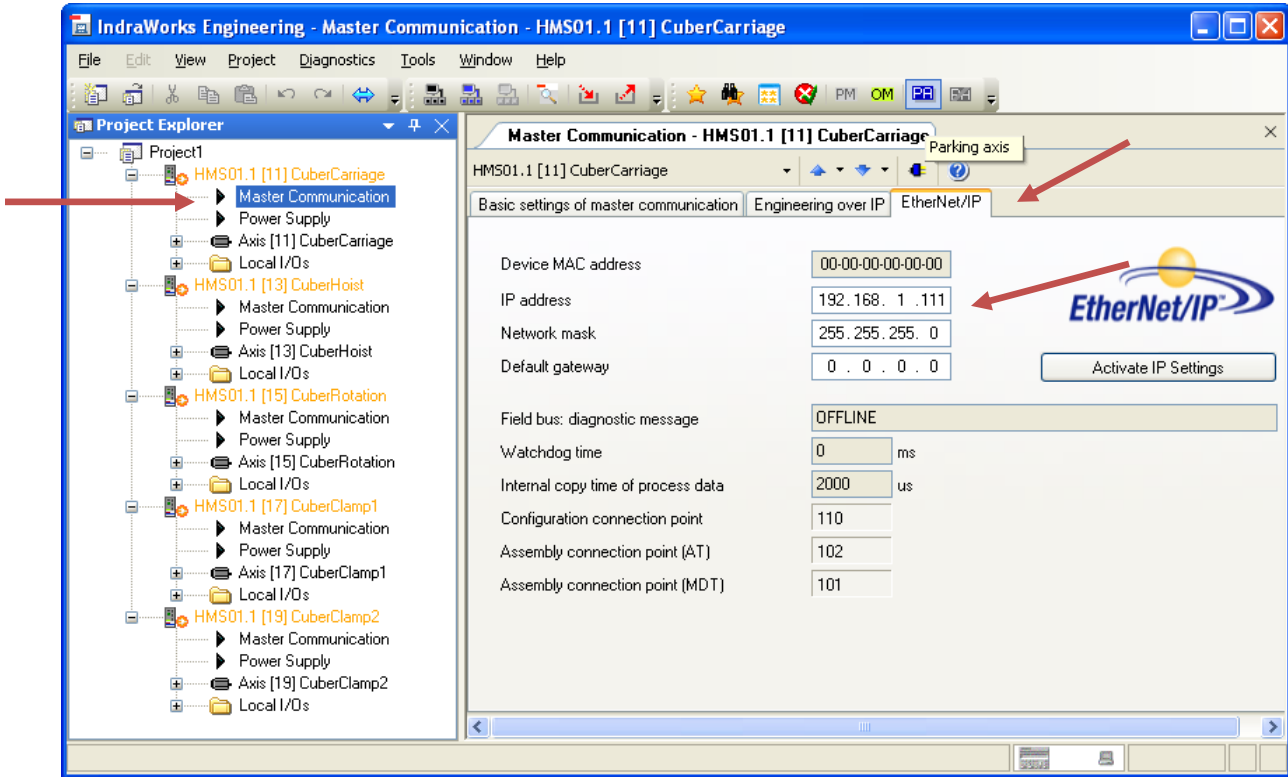


Set to EtherNet/IP.

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

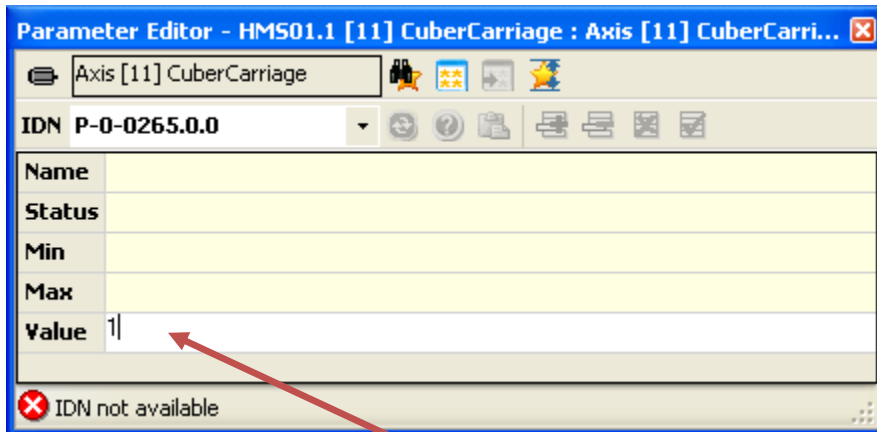


Set Communication to PLC IP Address from “Master Communication” project tree:



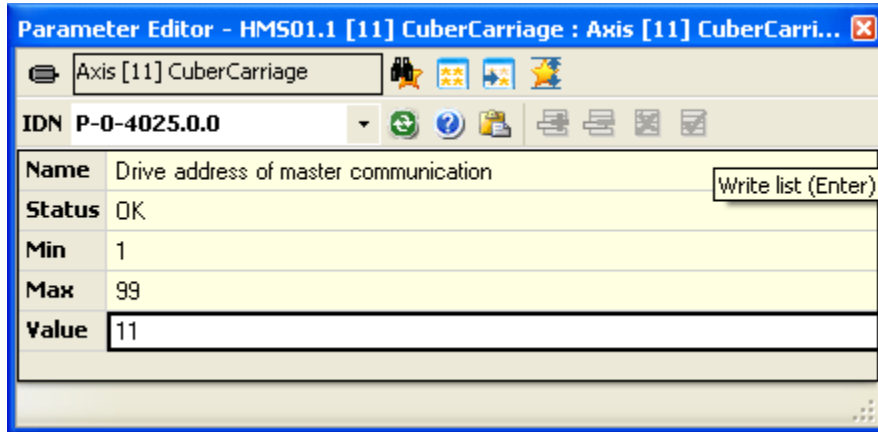
Enter IP address for Servo Drive.

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



Value = 1, for ENGLISH

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

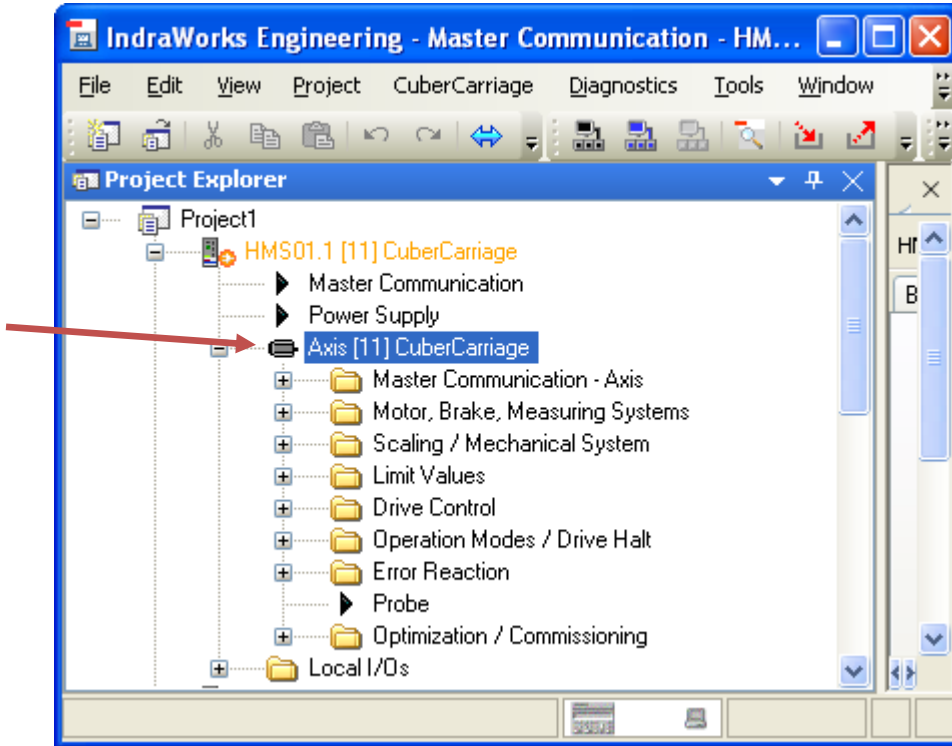


Enter node Number in VALUE field.

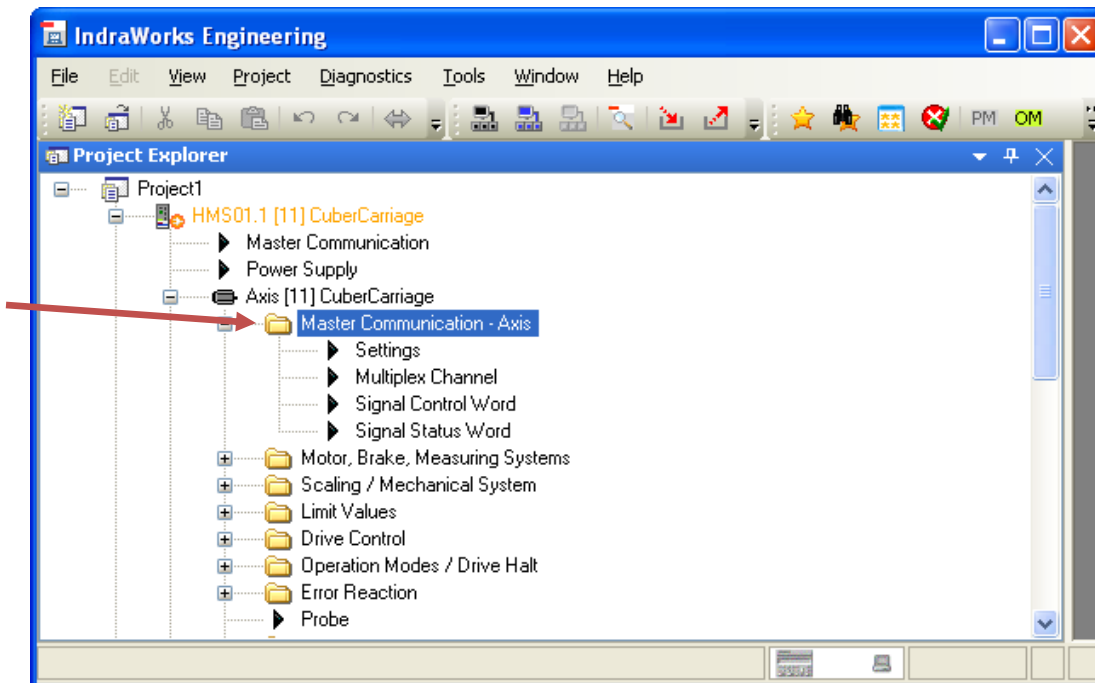
NOW POWER DOWN SERVO AND THEN POWER BACK UP SO THAT COMMUNICATION IP ADDRESS WILL BE SAVED AND THE ETHERNET PARAMETERS WILL BE VISIBLE!!!

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

Open Axis:

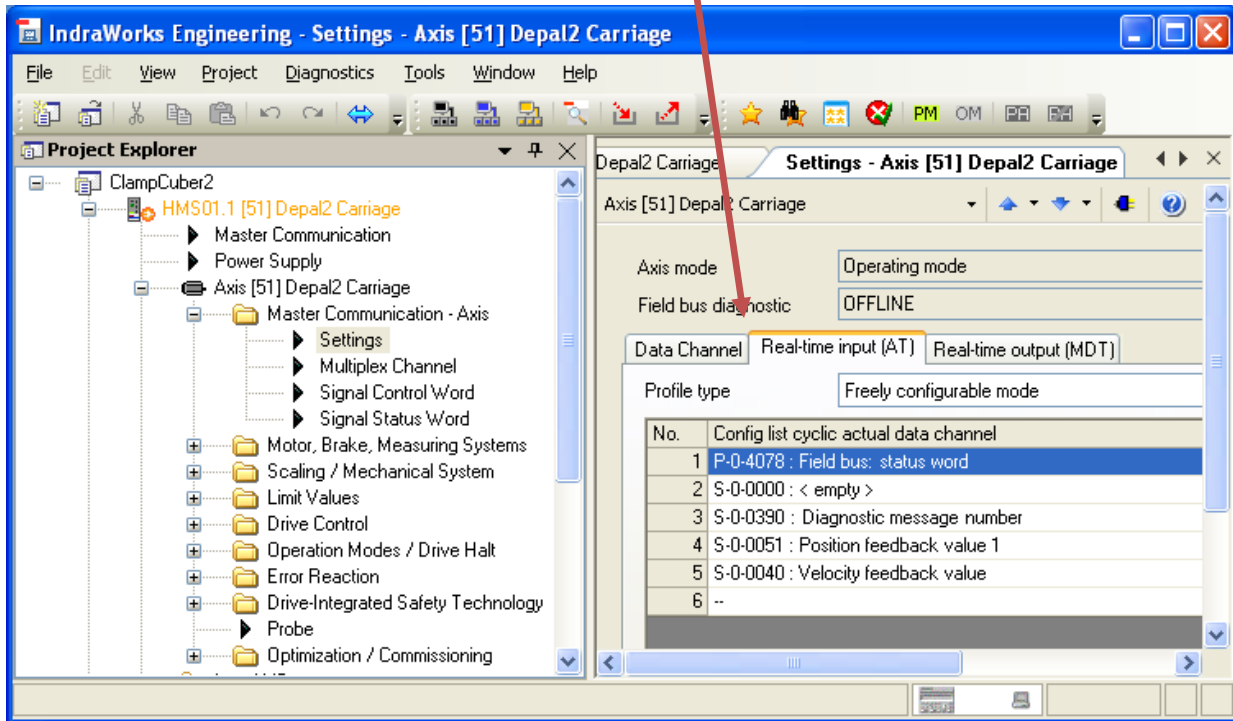


Open Master Communication - Axis:

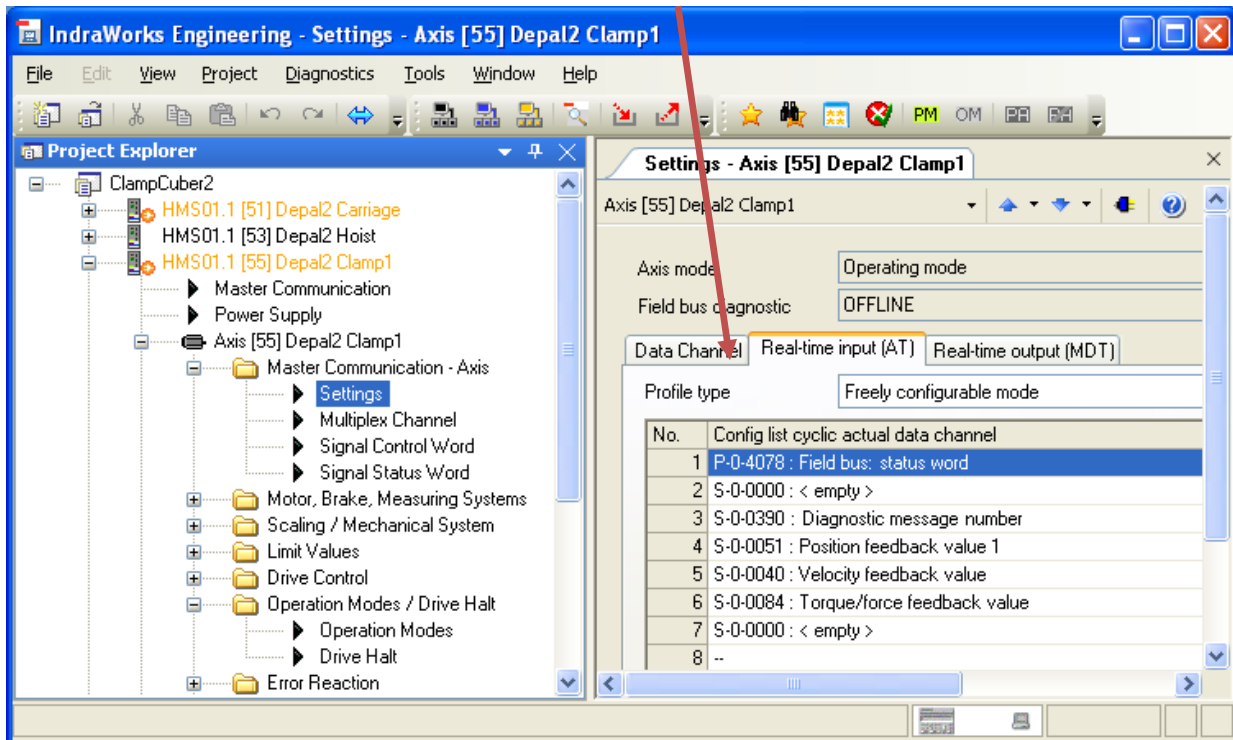


SET UP REAL-TIME INPUT (AT) PARAMETERS:

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

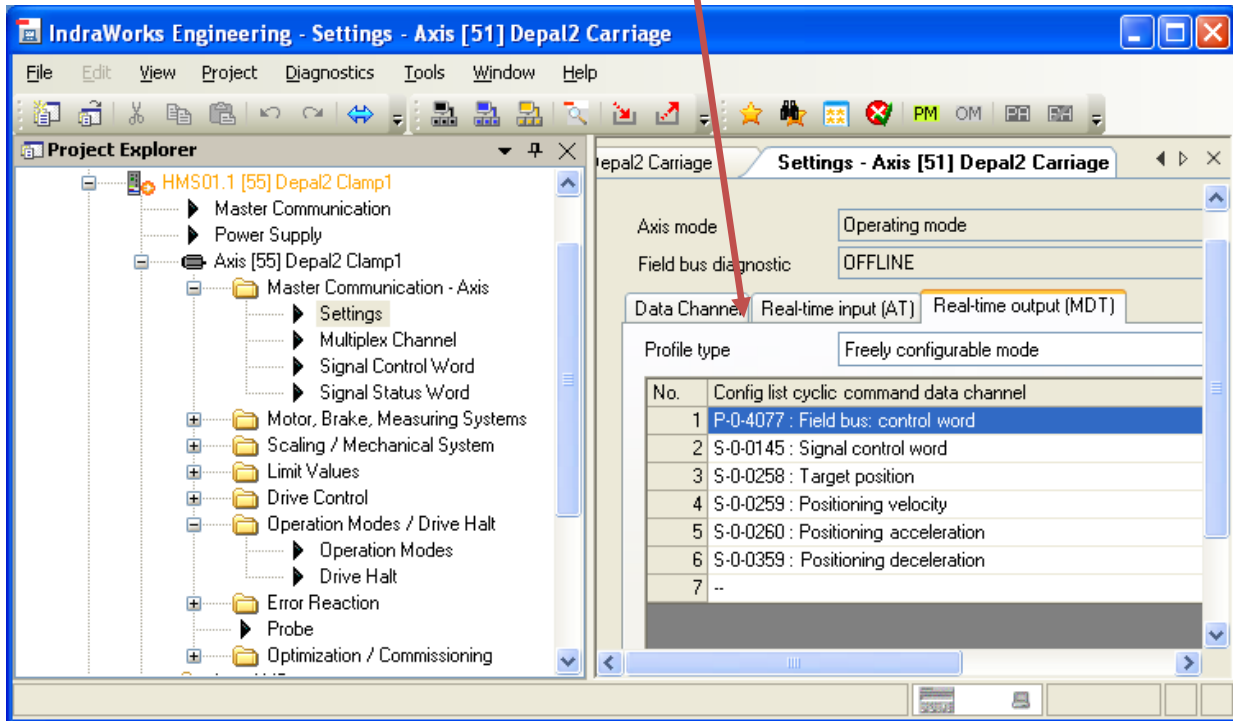


These parameters are for Cuber Clamps (Servo Drive to PLC).

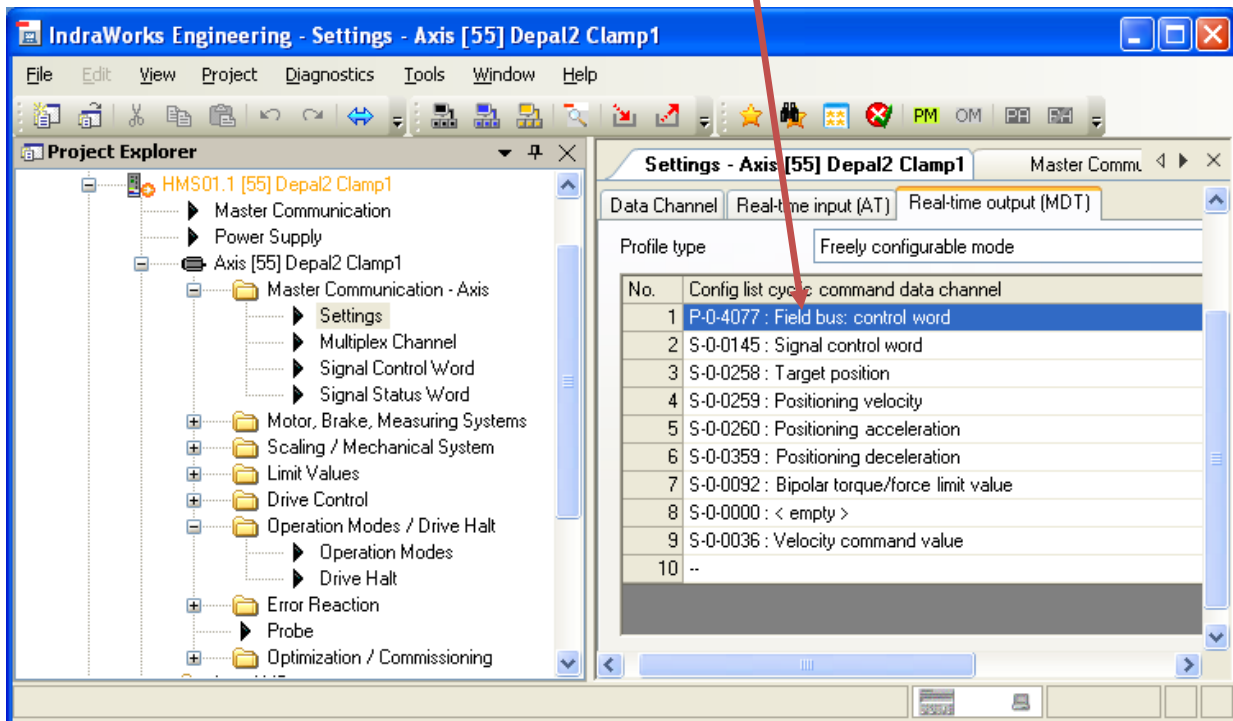


SET UP REAL-TIME OUTPUT (MDT) PARAMETERS:

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



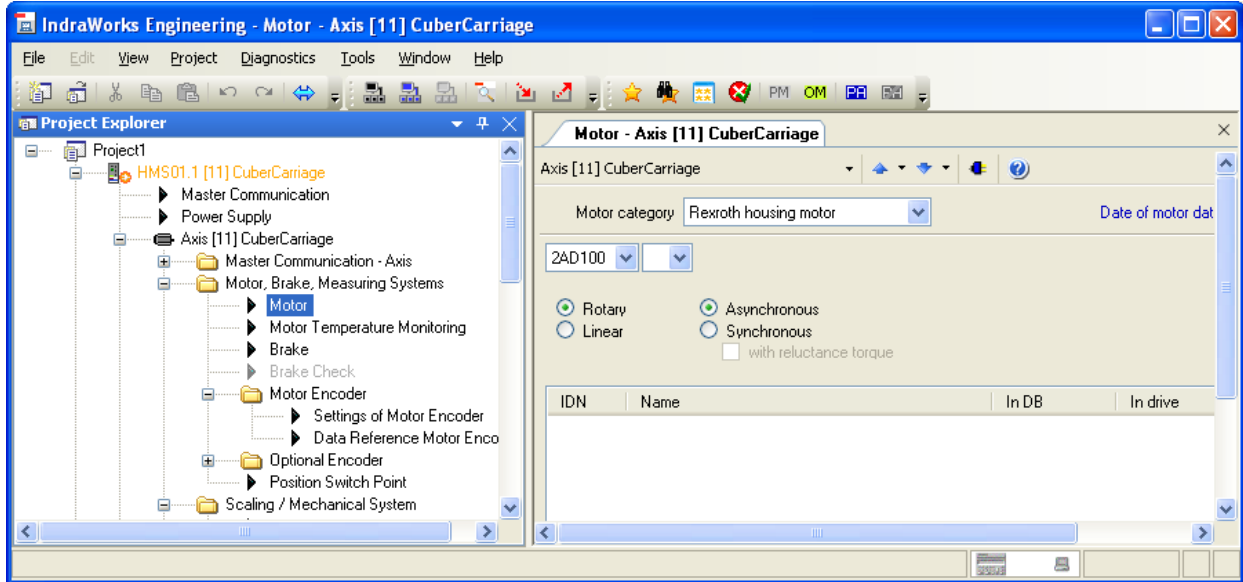
These parameters are for Cuber Clamps (PLC to Servo Drive).



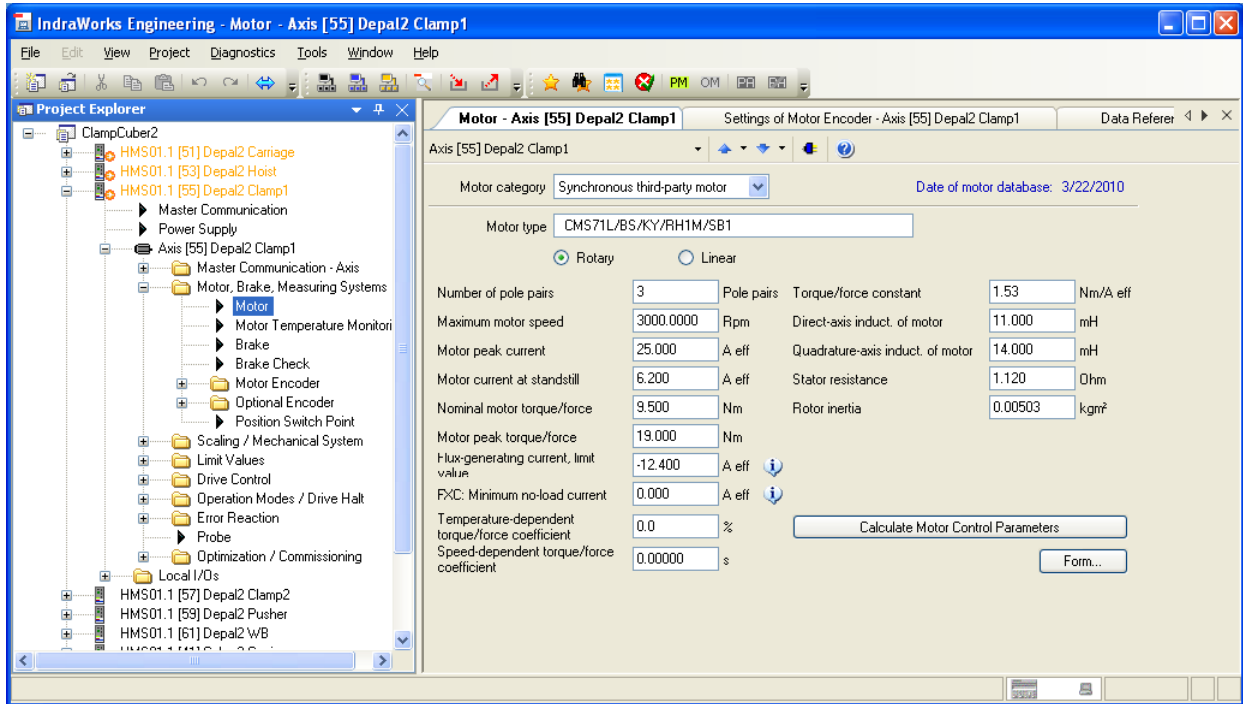
MOTOR, BRAKE, MEASURING SYSTEM SETTINGS:

Motor:

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

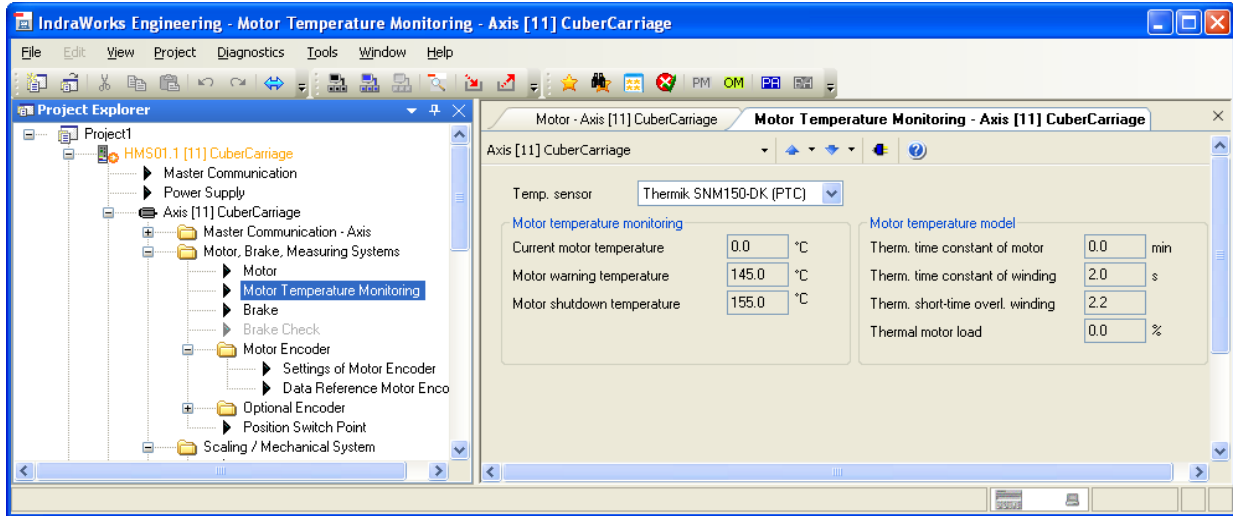


W/Non Rexroth motor this information is entered manually (Clamps):

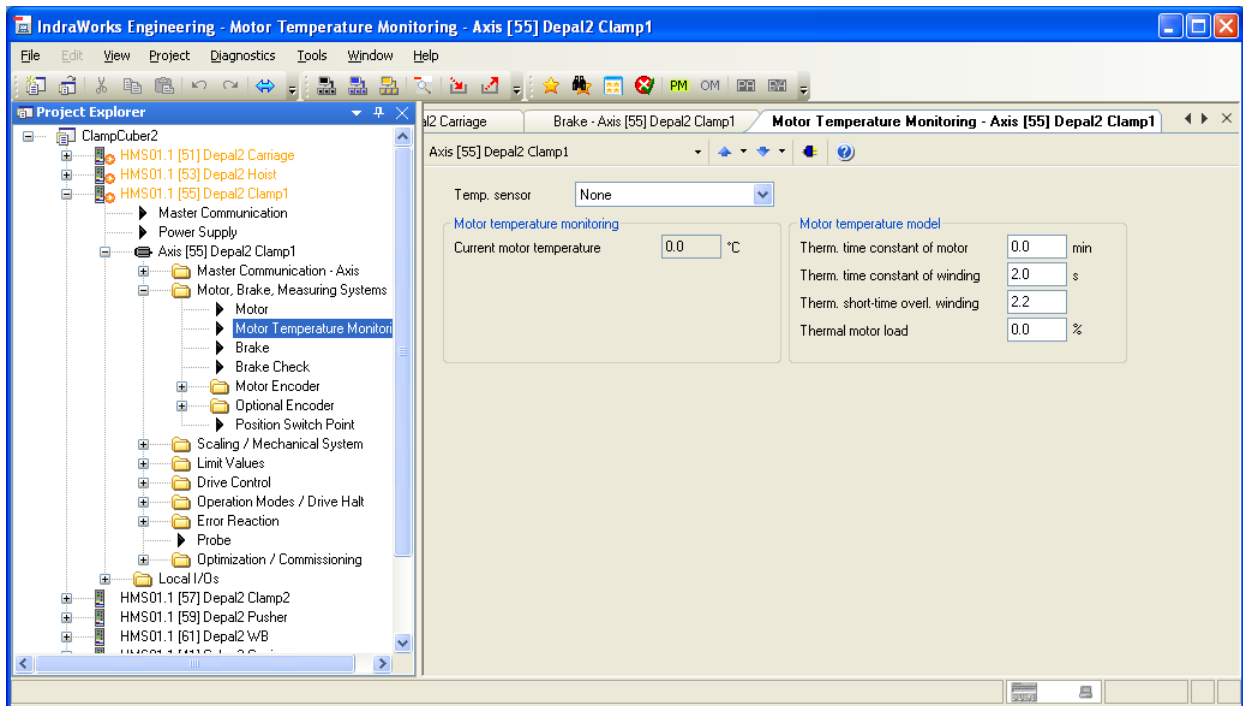


Motor Temperature Monitoring:

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

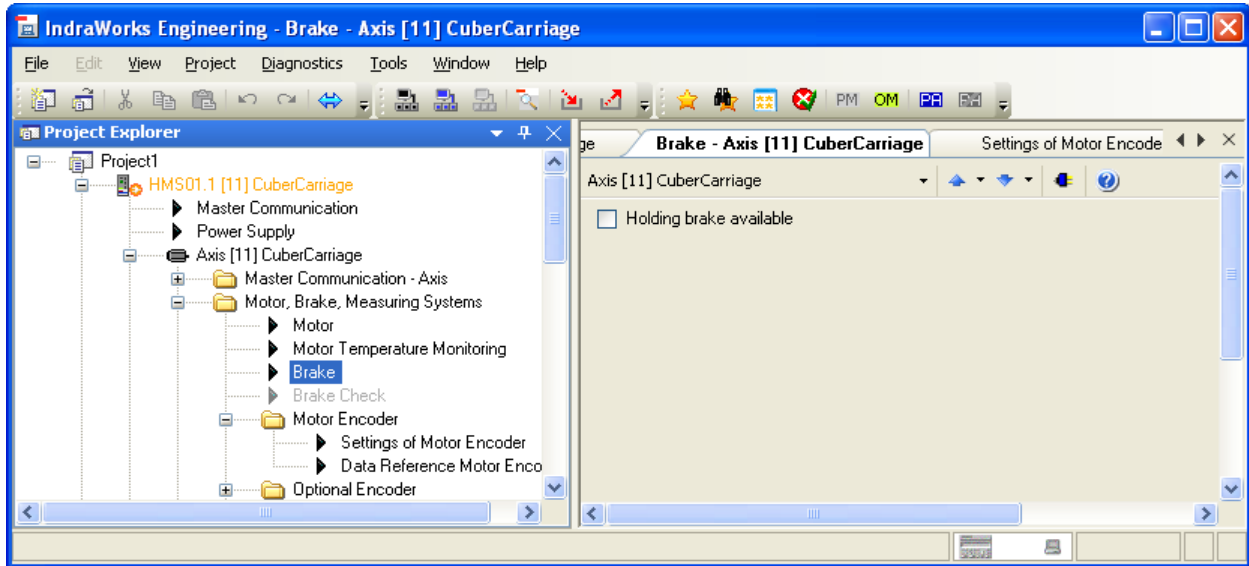


W/Non Rexroth motor this information is entered manually (Clamps):

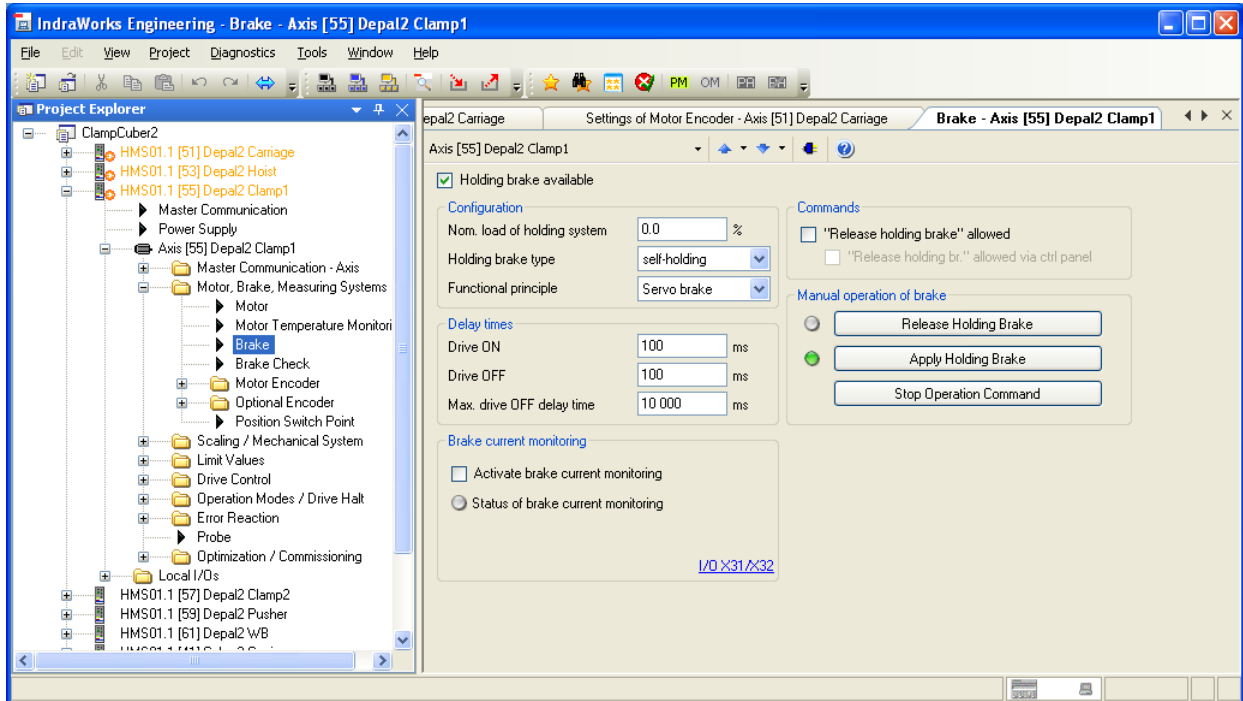


Brake:

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

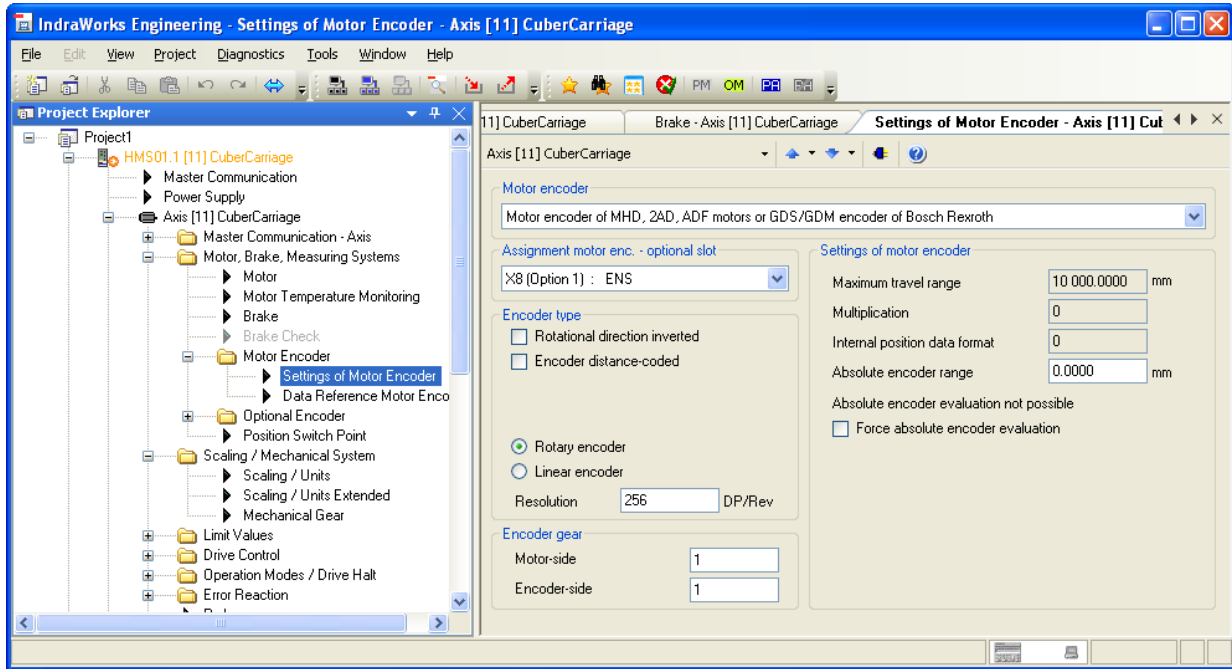


W/Non Rexroth motor this information is entered manually (Clamps):

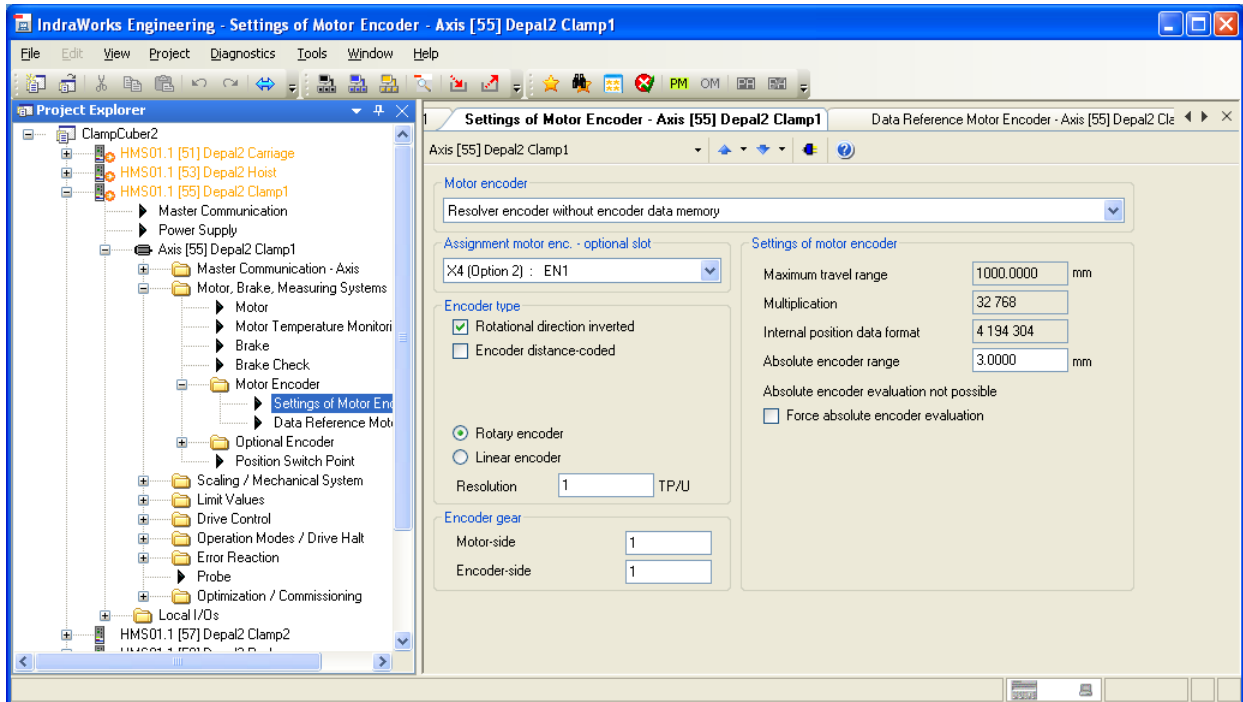


Setting of Motor Encoder:

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

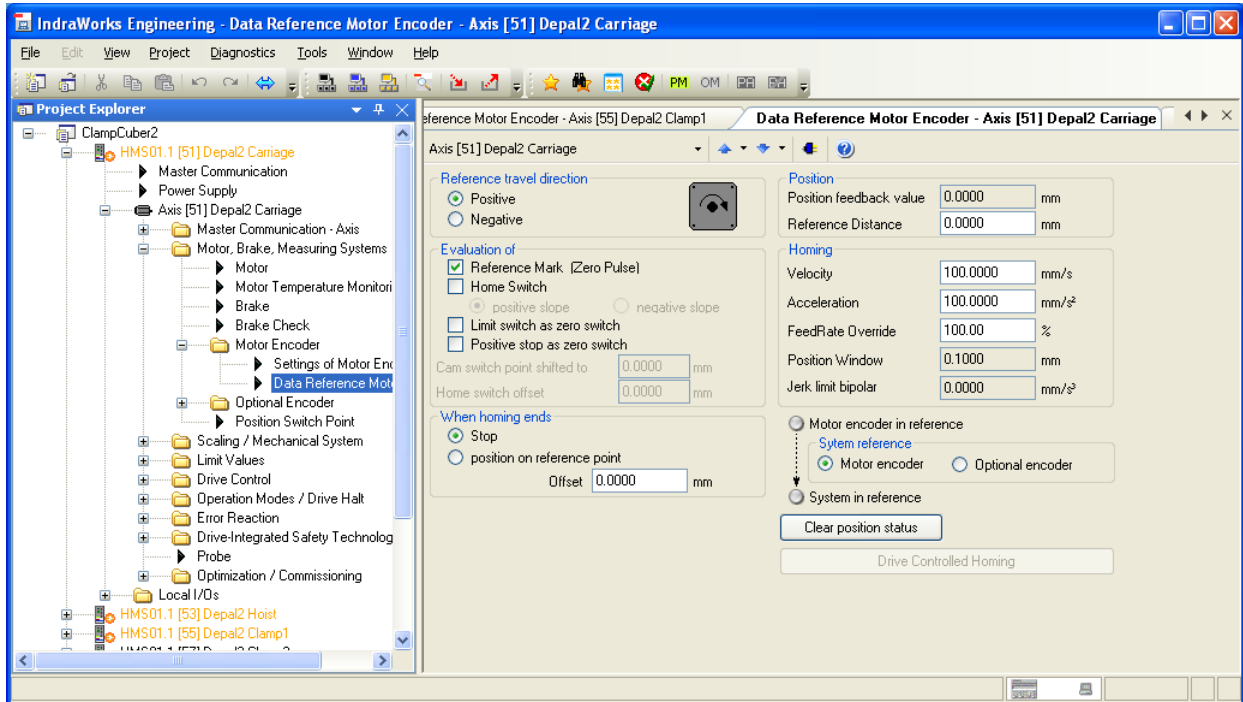


W/Non Rexroth motor this information is entered manually (Clamps):

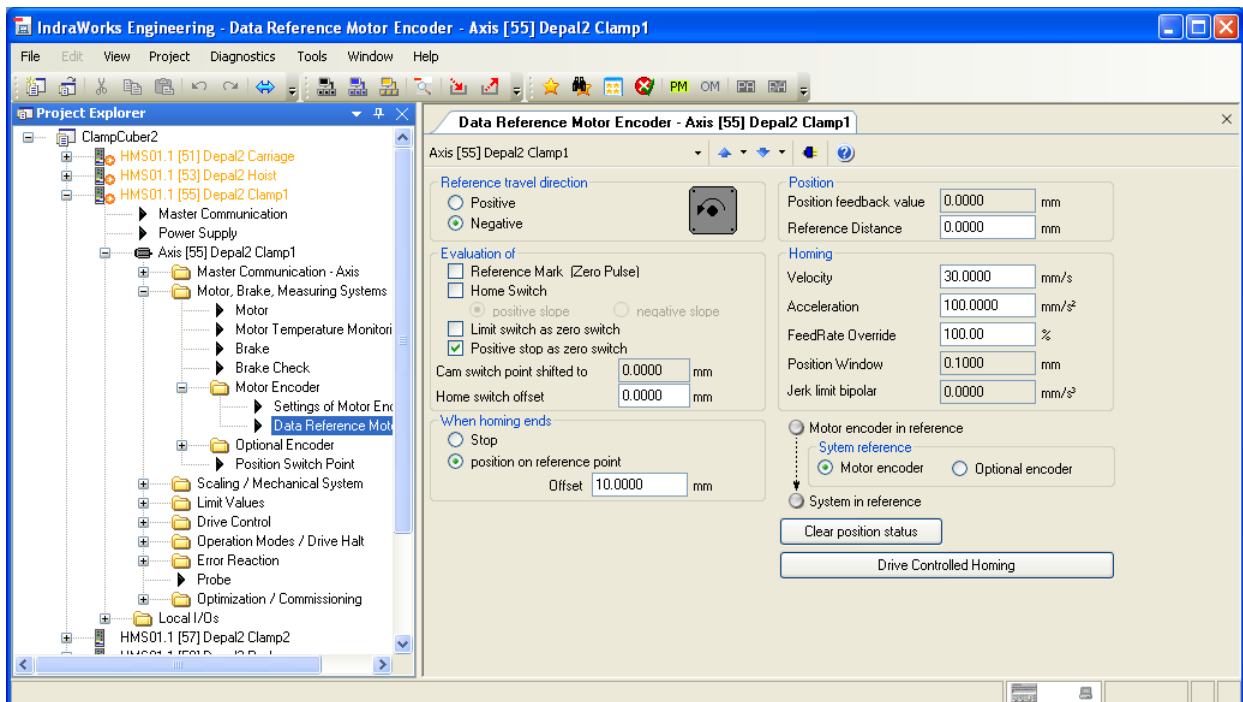


Data Reference Motor Encoder:

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



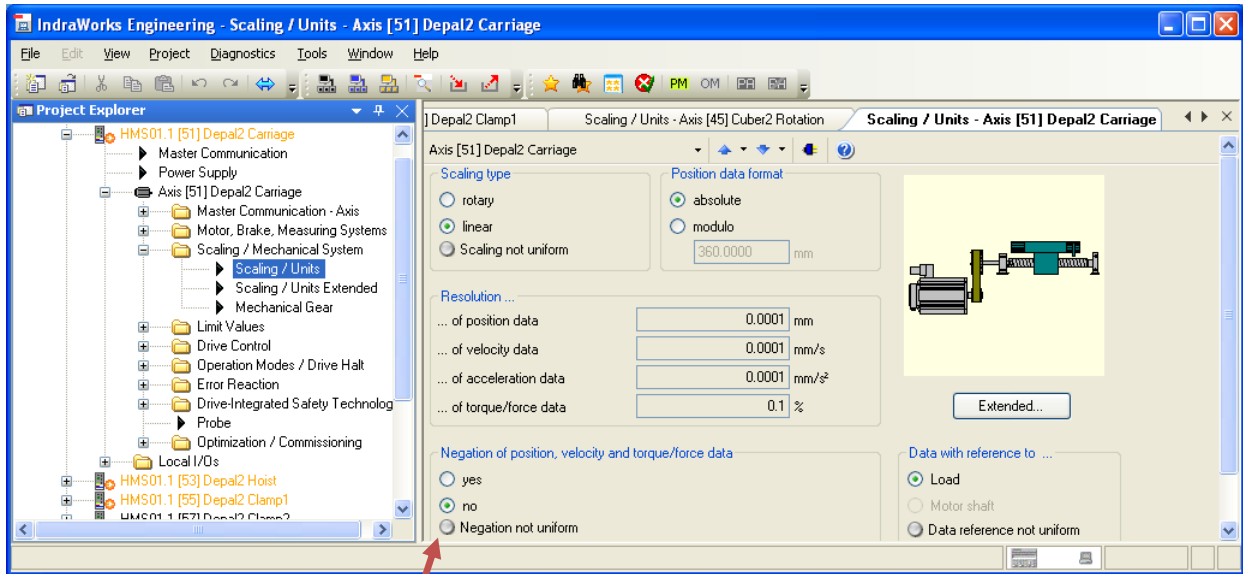
W/Non Rexroth motor this information is entered manually (Clamps):



SET SCALING/MECHANICAL SYSTEM:

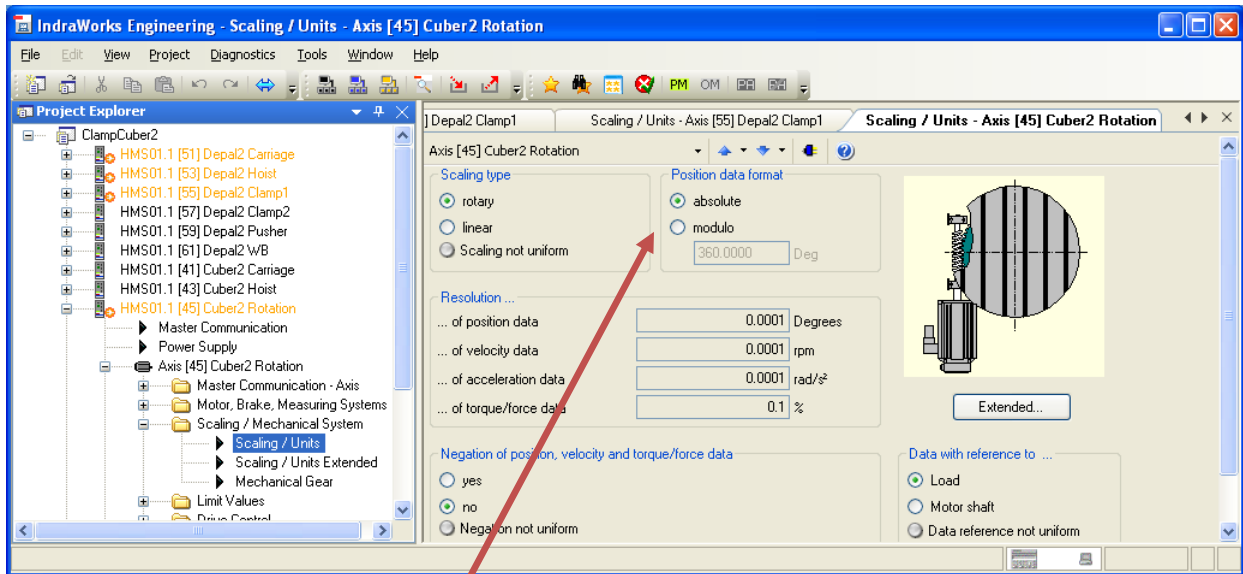
Scaling/Units:

Typical Scaling:



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

Scaling for Rotation Axis:

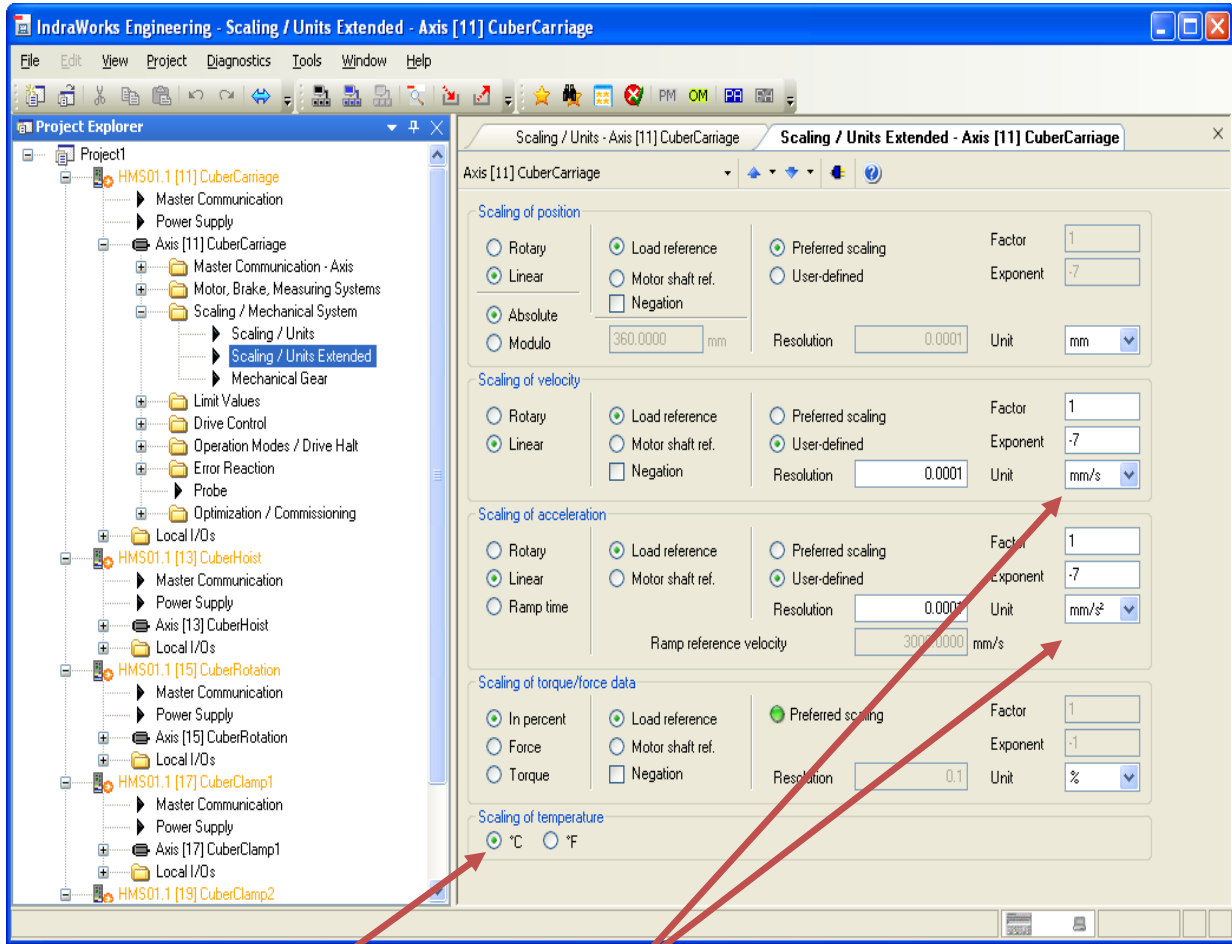


Absolute for non resettable positioning

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:

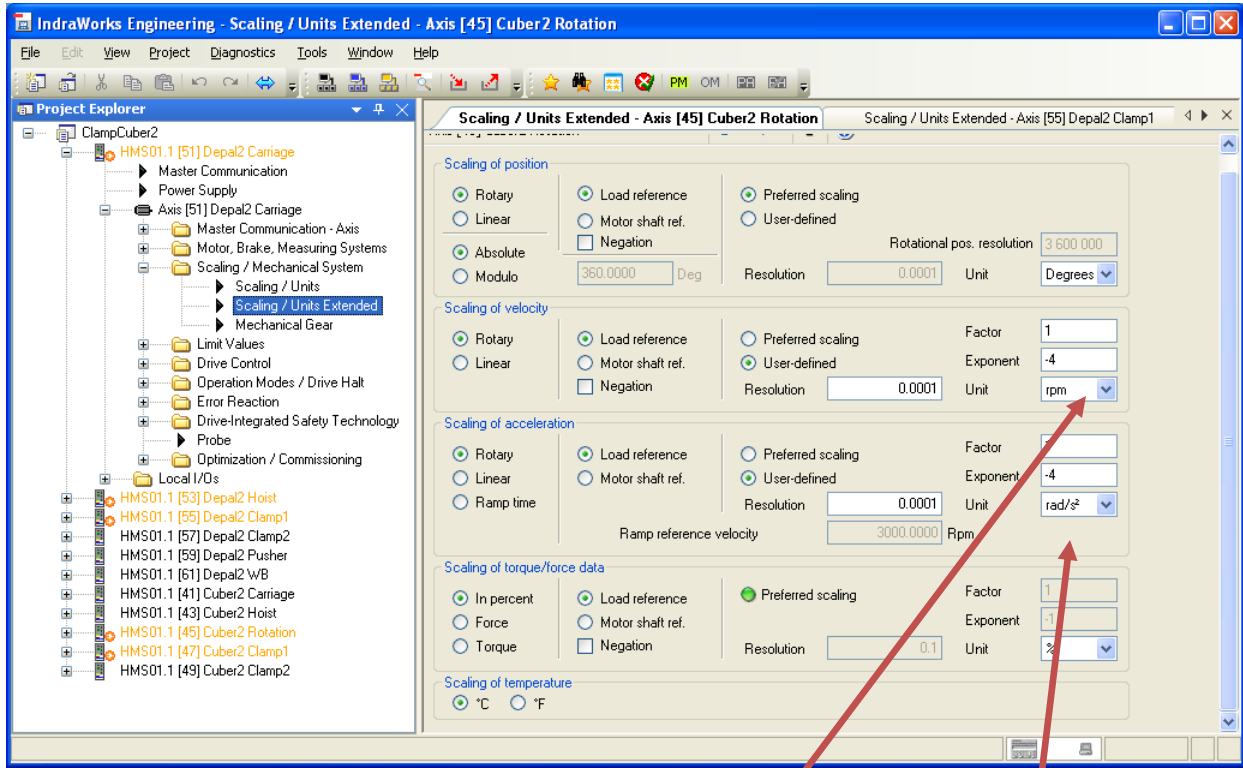


Change from mm/min to mm/s.

Access parameter S-383 for actual motor temperature.

Scaling/Units Extended:

Rotation Axis Extended Scaling:

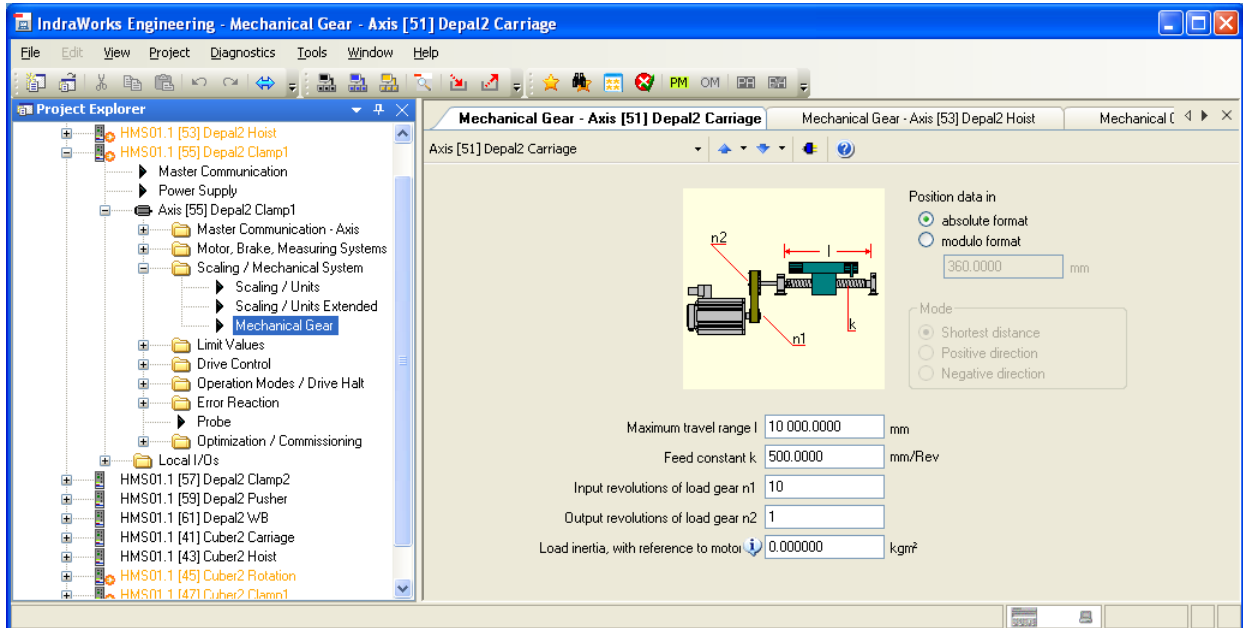


Mechanical Gear:

mm to rpm

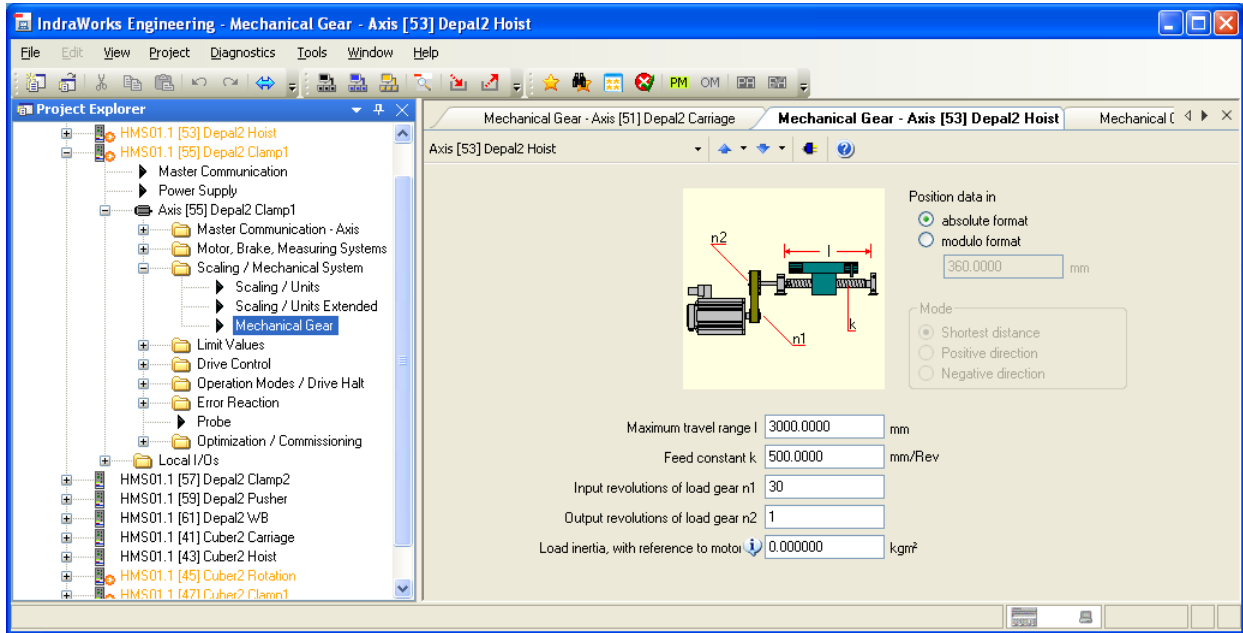
mm to rad/s²

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

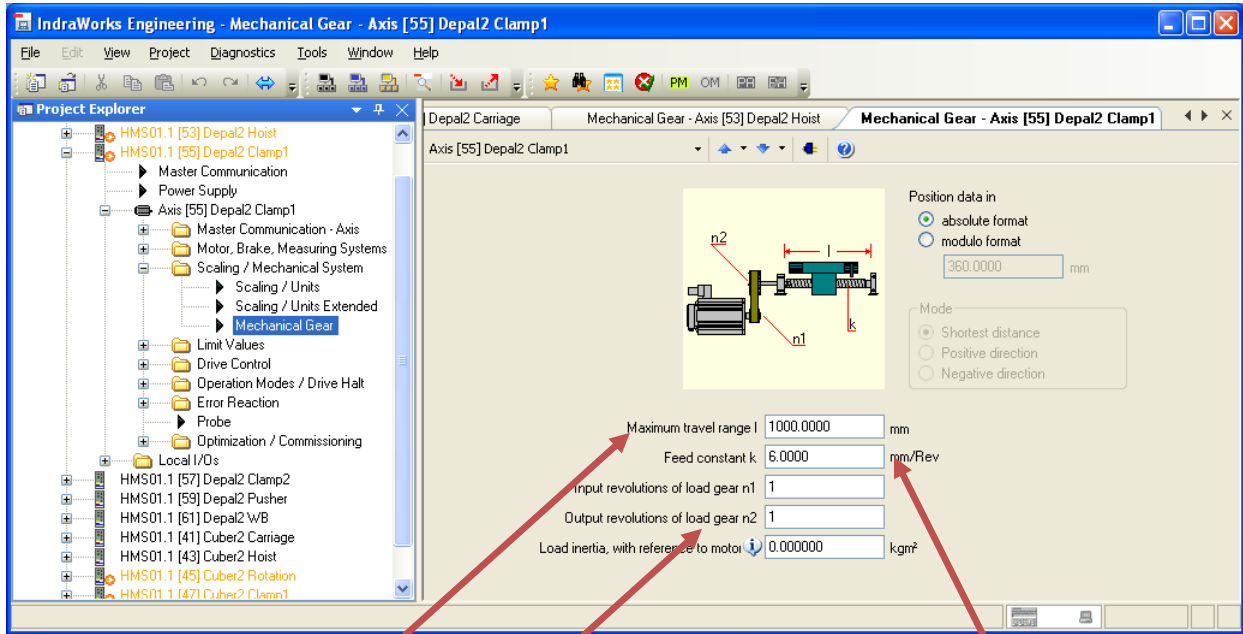


Mechanical Gear:

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



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



Set to twice expected max travel.

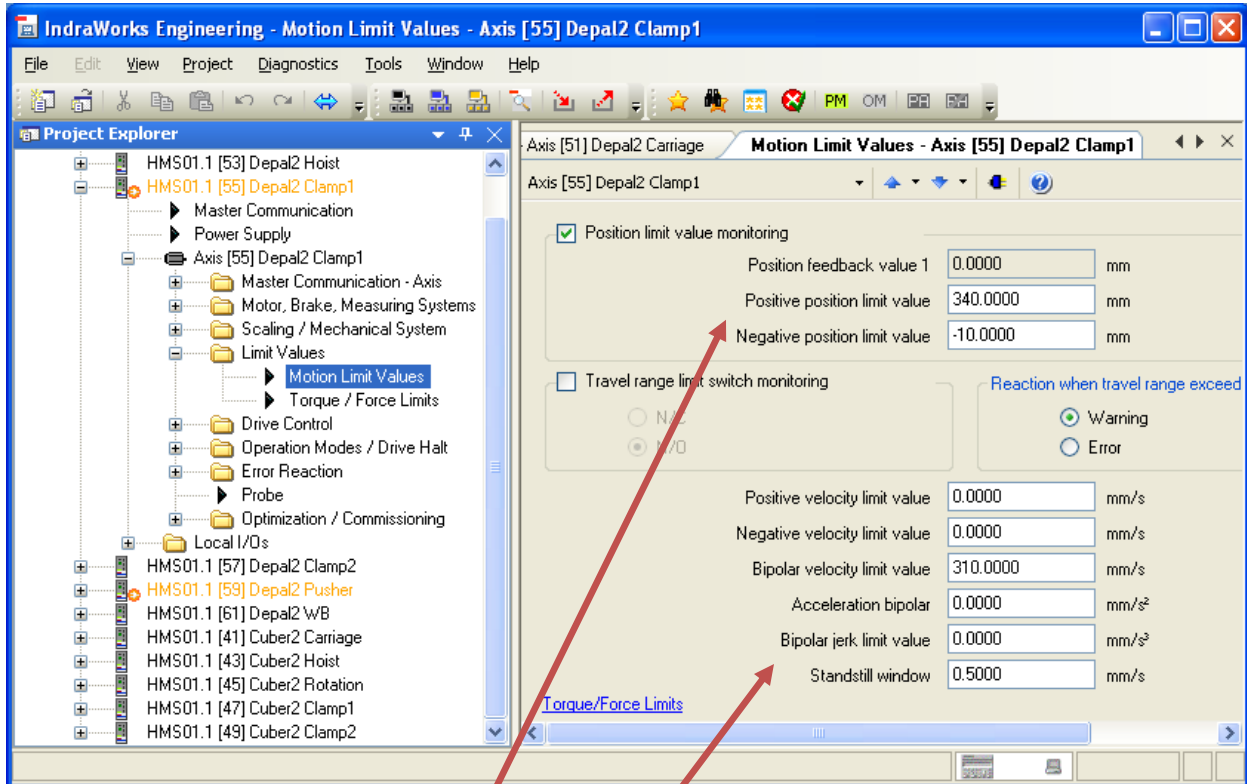
How far load travels w/on rev of gear box

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.

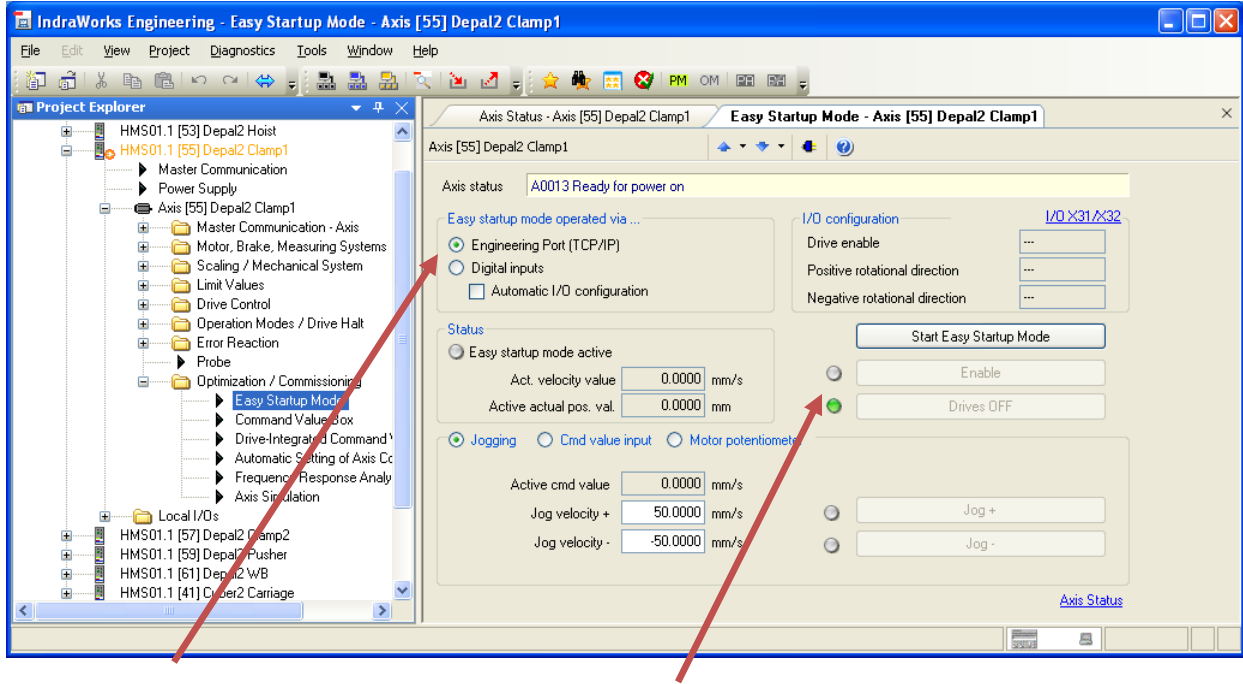
"Positive position limit value" is determined by moving to the furthest forward position and recording the Actual Position. **The axis must be "Homed" before setting Positive Limits for the Actual Position to display the correct value. Drive must be "Disabled" for changes to take effect.**

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

Bipolar jerk limit vale = S ramp

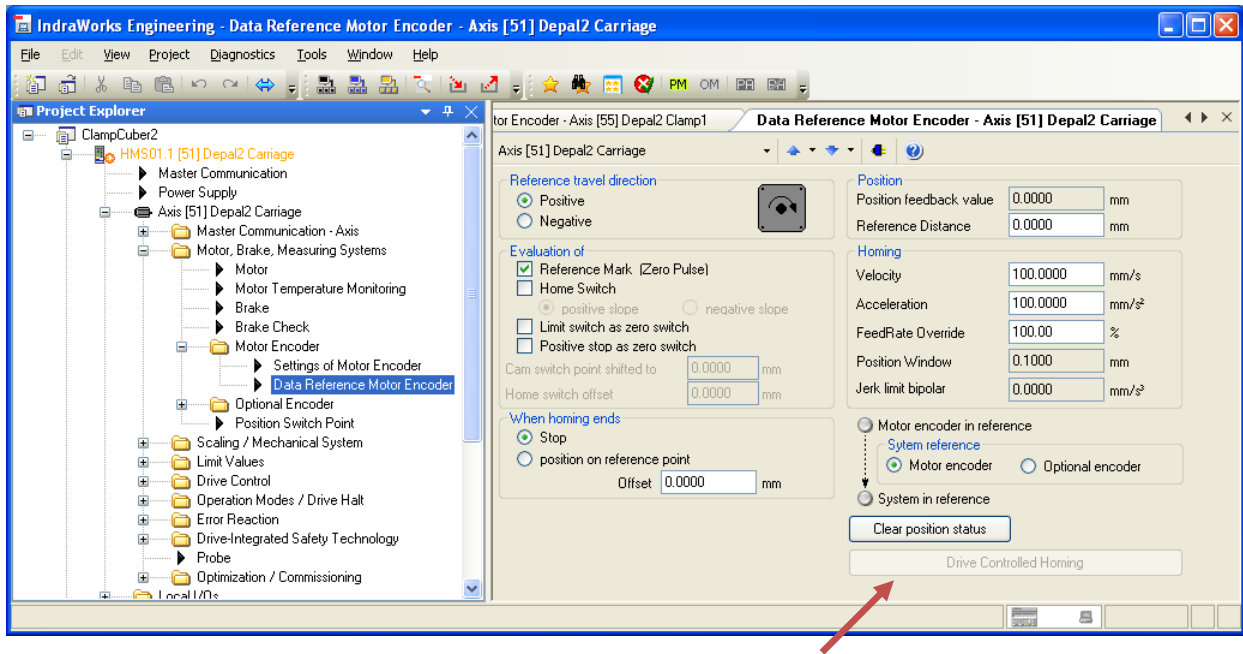
SETTING LIMITS AND HOMING (from Laptop):

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



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

HOMING (from Laptop):



With the Axis in the “Home” Position click “Drive Controlled Homing”.

Torque/Force Limits:

Typical Force Limits:

The screenshot shows the 'Torque / Force Limits - Axis [11] CuberCarriage' configuration window. The 'Project Explorer' on the left shows the hierarchy for 'HMS01.1 [11] CuberCarriage'. The main window displays a block diagram of the control system with 'Axis Control' and 'Current Limits' blocks. Below the diagram, the following parameters are set:

Torque/ Force limit value positive	400.0	%
Torque/ Force limit value negative	-400.0	%
Torque/ Force peak limit	400.0	%
Bipolar Torque/ Force limit value	400.0	%
Act. value torque limit pos. (static)	0.1	%
Act. value torque limit neg. (static)	-0.1	%
Actual value peak torque limit	0.1	%

There is also a checkbox for 'Correction of the torque/force constant' which is unchecked.

Cuber Clamp Force Limits:

The screenshot shows the 'Torque / Force Limits - Axis [55] Depal2 Clamp1' configuration window. The 'Project Explorer' on the left shows the hierarchy for 'ClampCuber2'. The main window displays a block diagram of the control system with 'Axis Control' and 'Current Limits' blocks. Below the diagram, the following parameters are set:

Torque/ Force limit value positive	400.0	%
Torque/ Force limit value negative	-400.0	%
Torque/ Force peak limit	400.0	%
Bipolar Torque/ Force limit value	75.0	%
Act. value torque limit pos. (static)	10.5	%
Act. value torque limit neg. (static)	-10.5	%
Actual value peak torque limit	10.5	%

A red arrow points to the 'Bipolar Torque/ Force limit value' field, which is set to 75.0%.

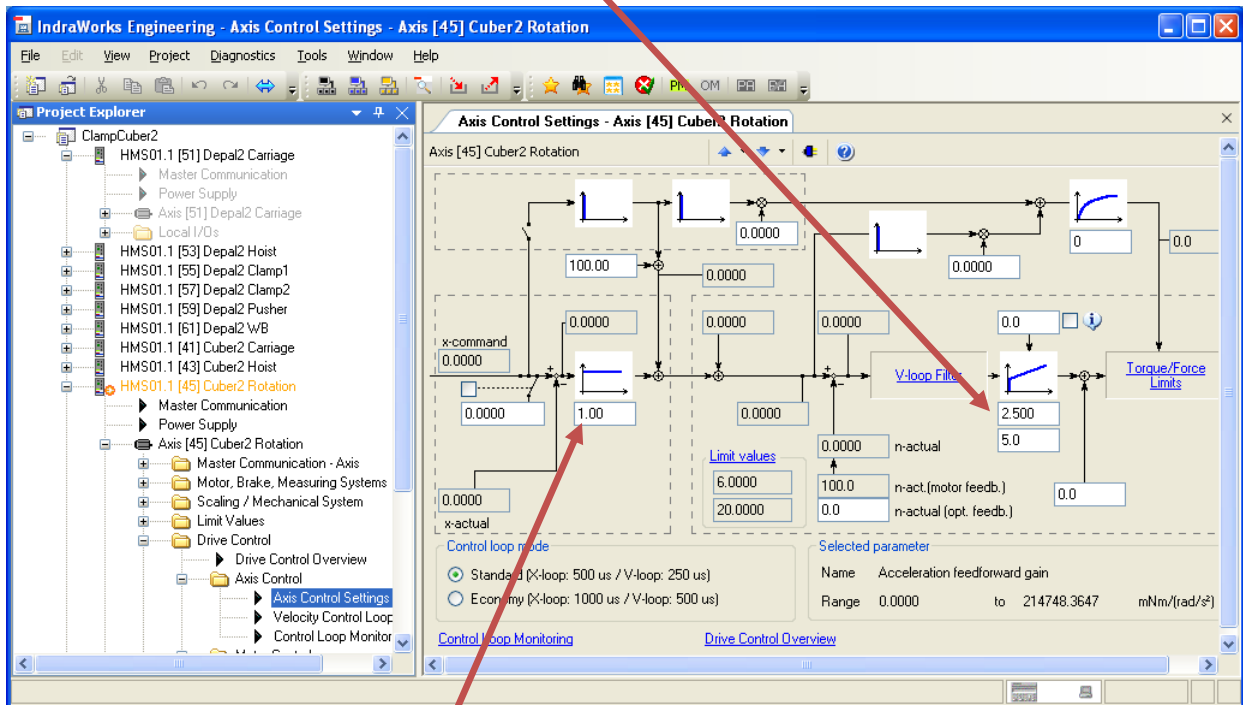
Value adjusted for Clamp Cuber Clamp.

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

DRIVE CONTROL / AXIS CONTROL:

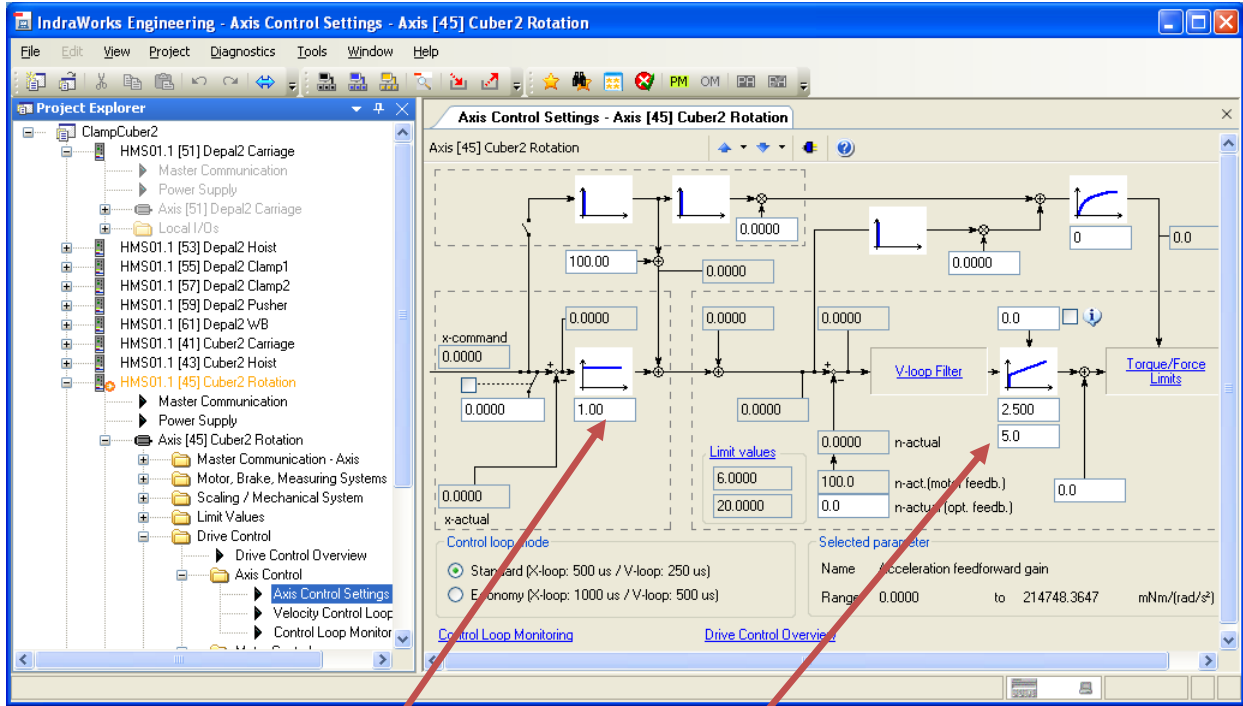
GAINS:

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.

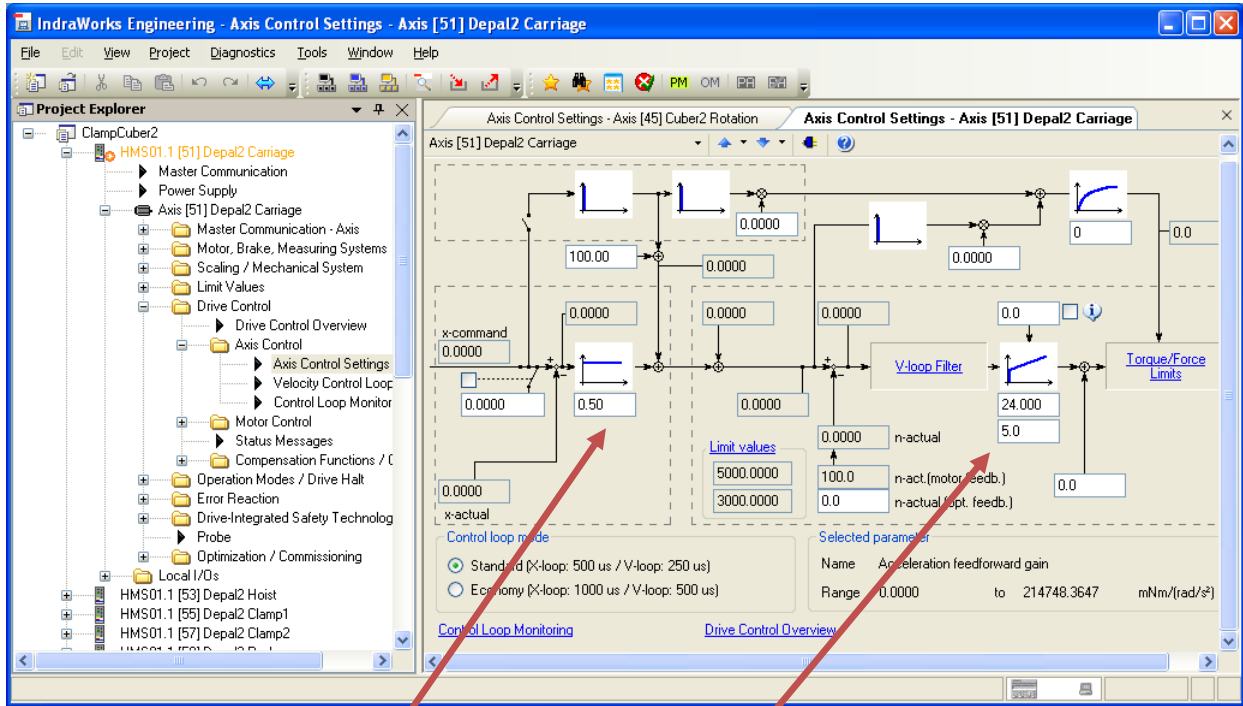


Position Loop Proportional Gain: Higher the number the tighter the control. Typically proper setting is derived by adjusting the number upwards until oscillation is detected then lower the number until oscillation is no longer seen.

Axis Control Settings:

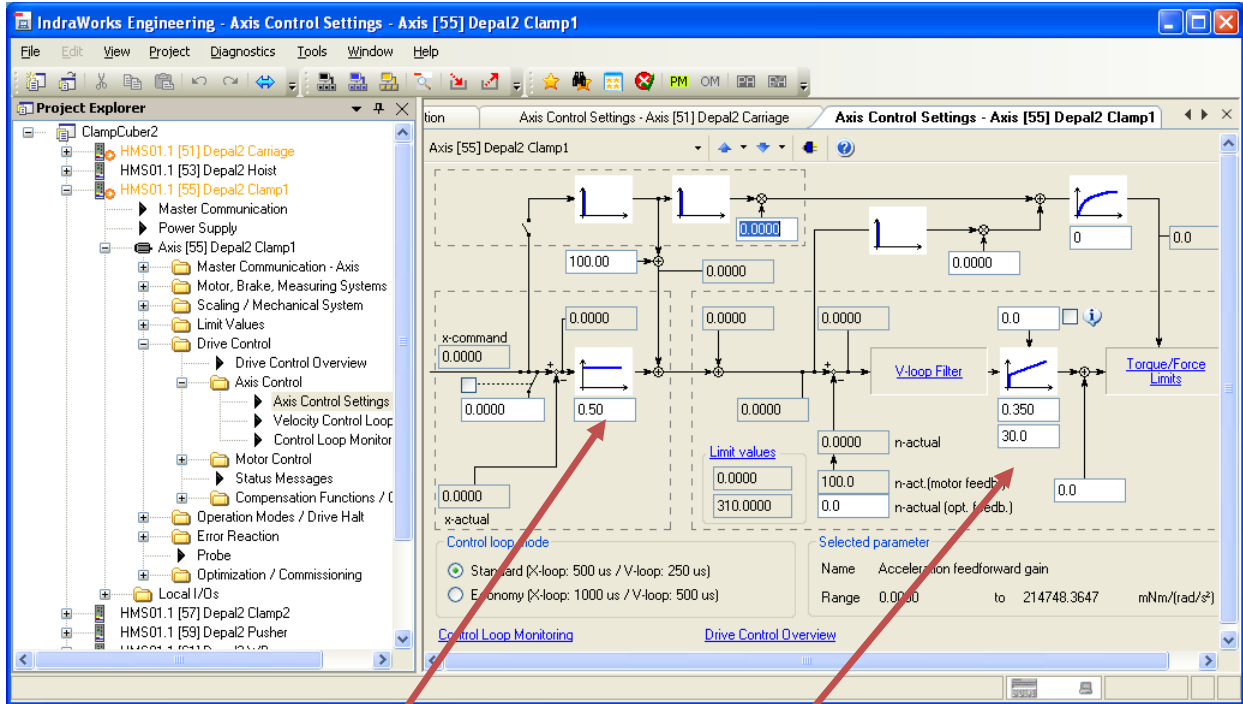


Values adjusted for Clamp Cuber Rotation.

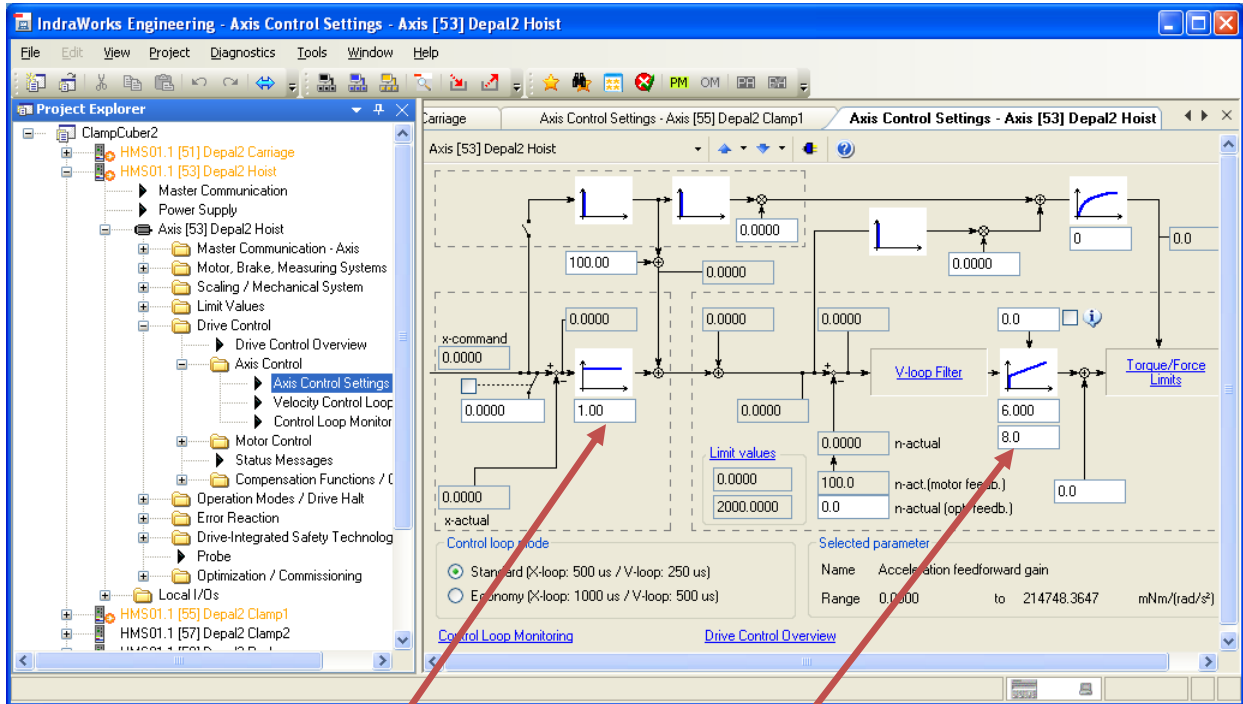


Values adjusted for Clamp Cuber Carriage.

Axis Control Settings:



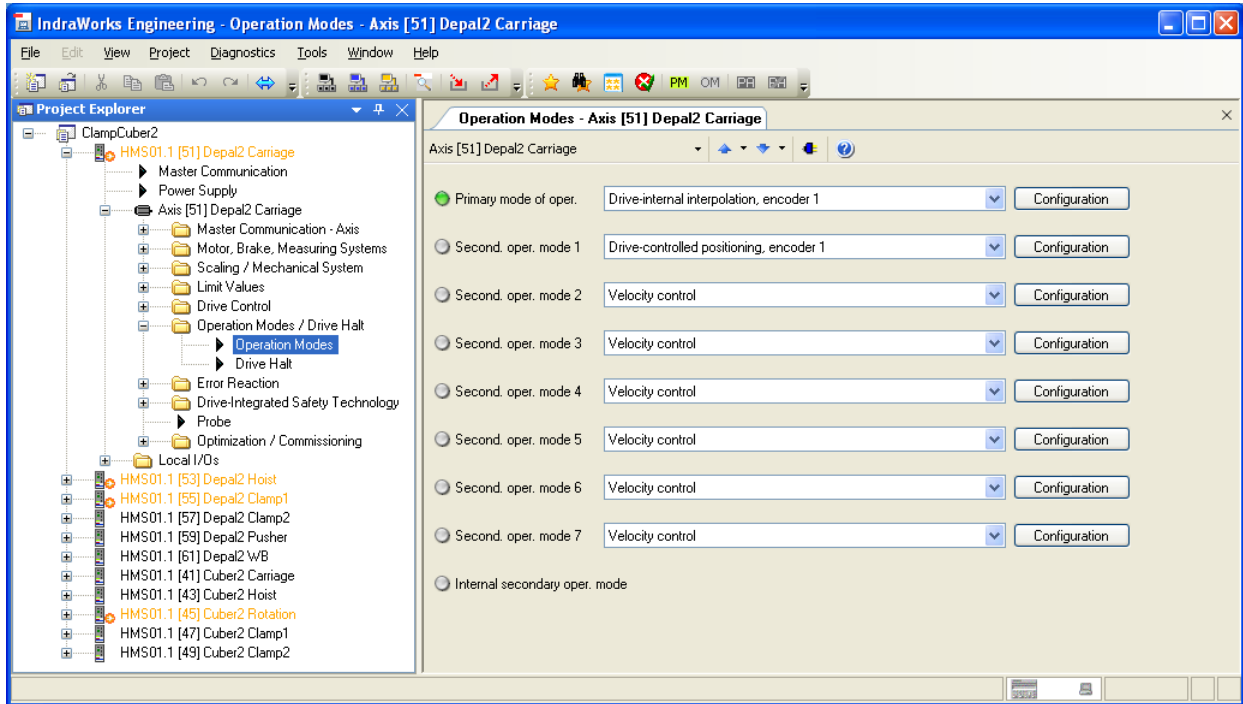
Values adjusted for Clamp Cuber Clamp.



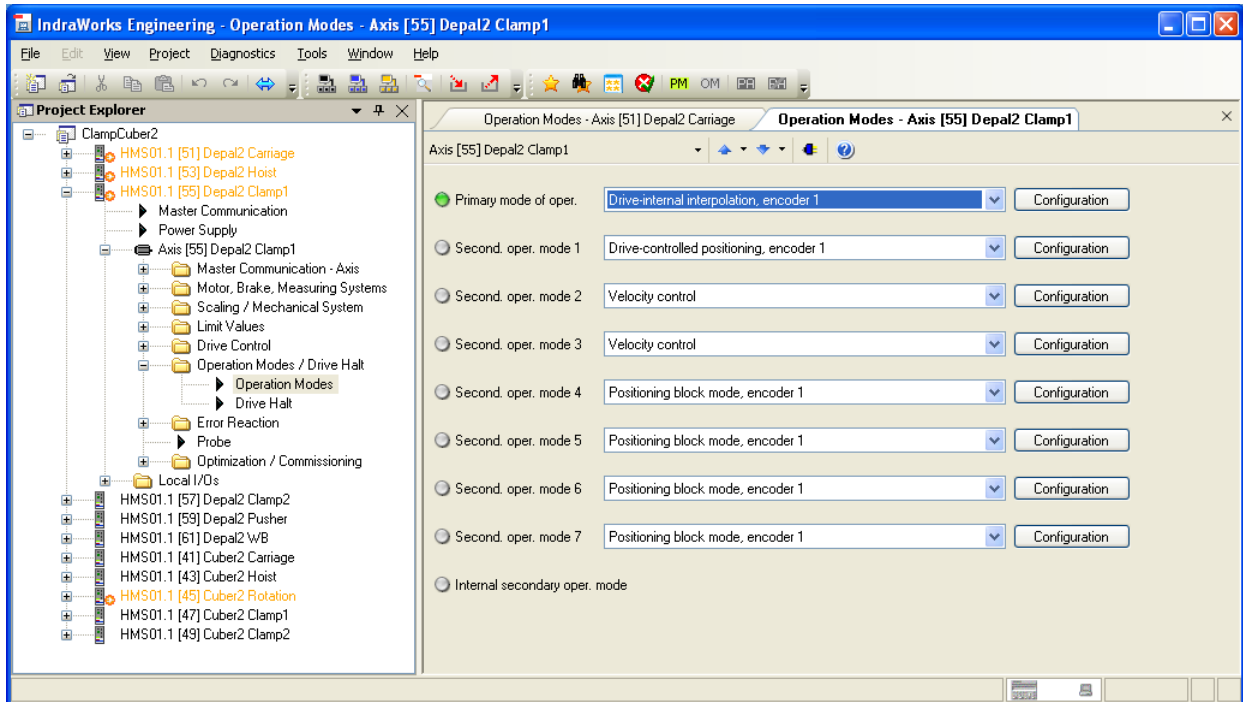
Values adjusted for Clamp Cuber Hoist.

OPERATIONAL MODE / DRIVE HALT:

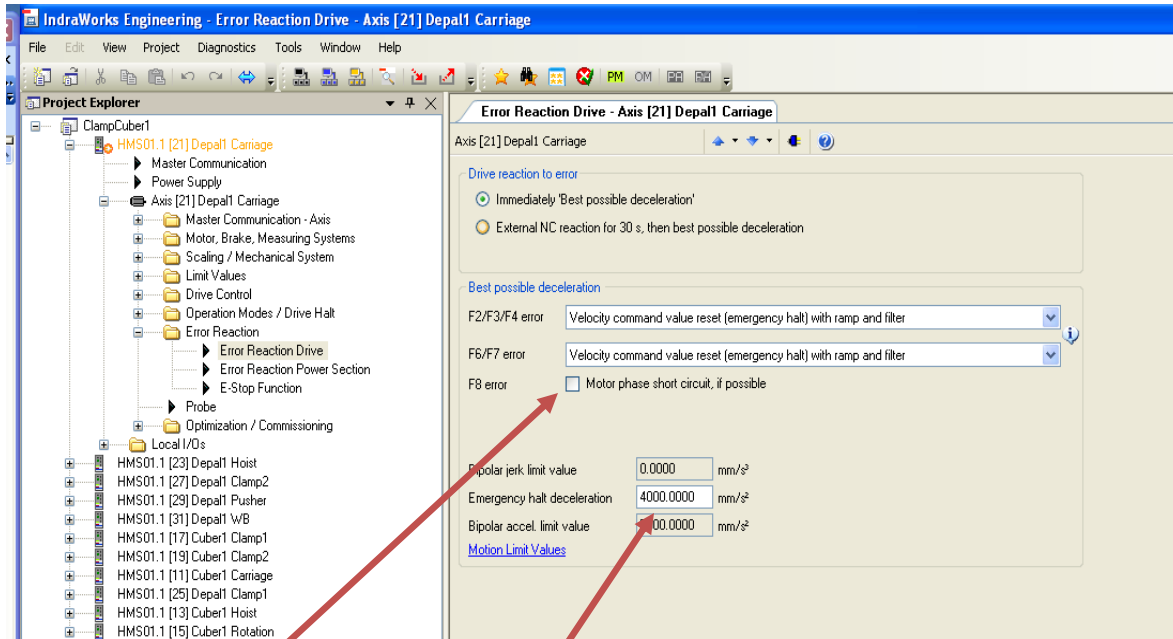
Typical Operational Modes (controlled positioning = Jog, internal interpolation = auto):



Clamp Operational Modes:

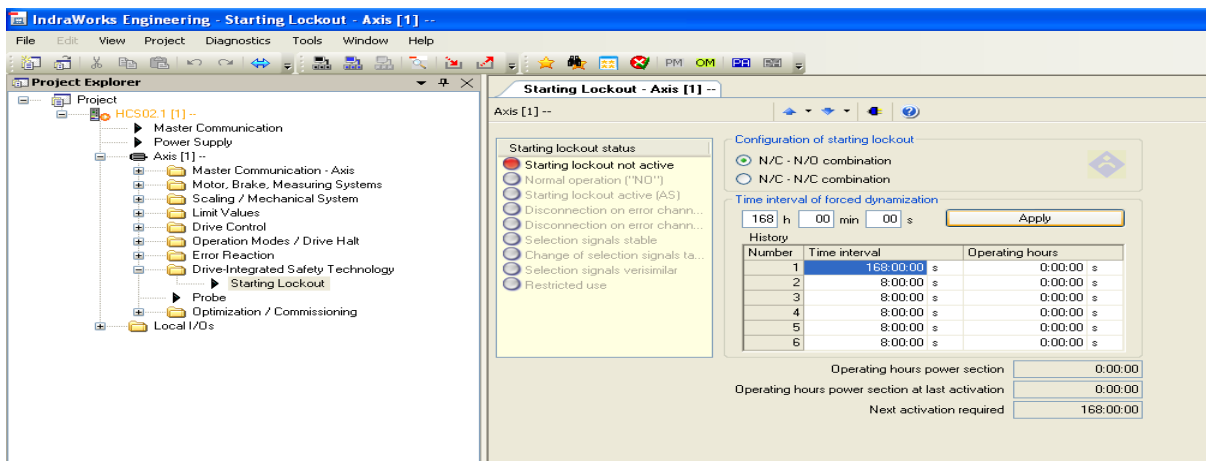


SAFETY SETTINGS:

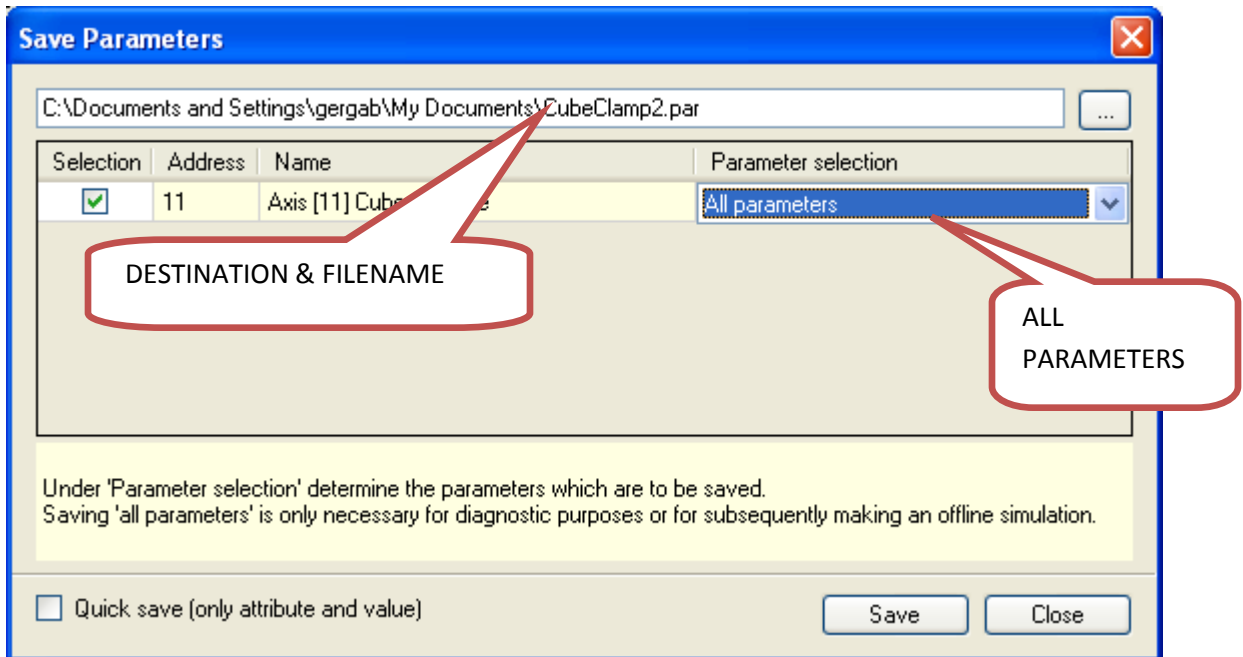
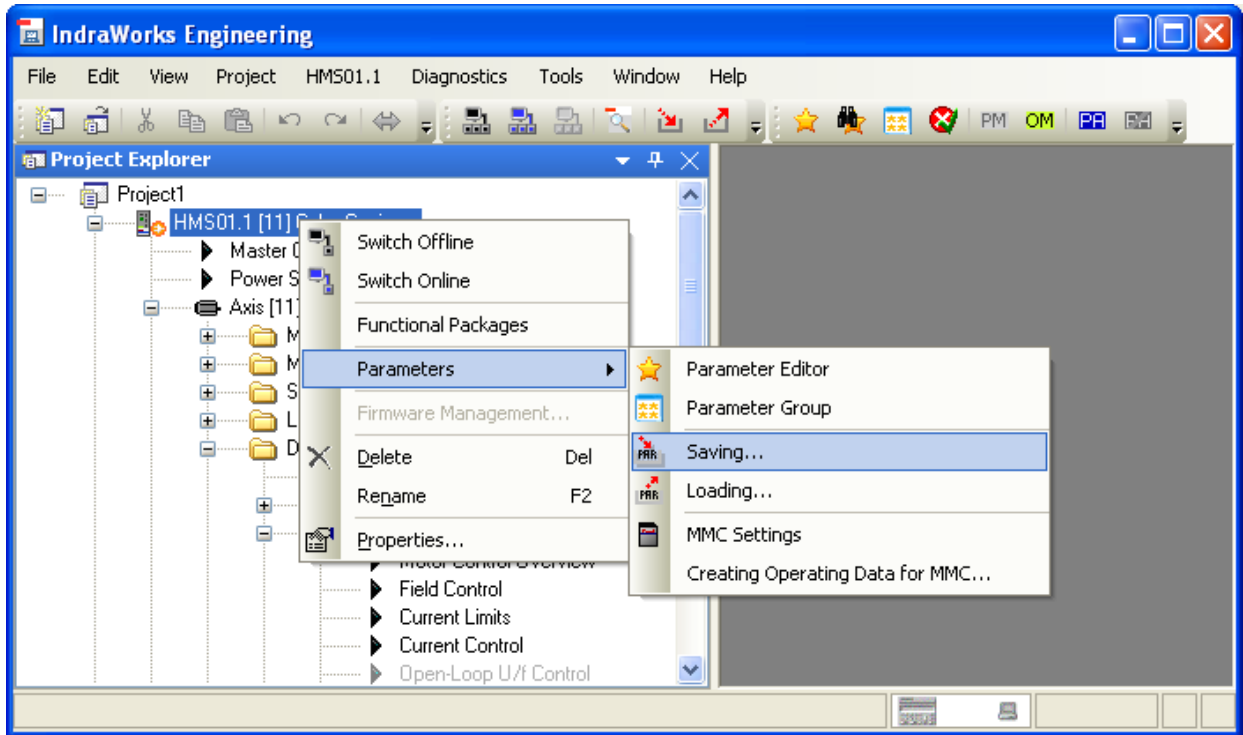


Check F8 error box on Carriages.

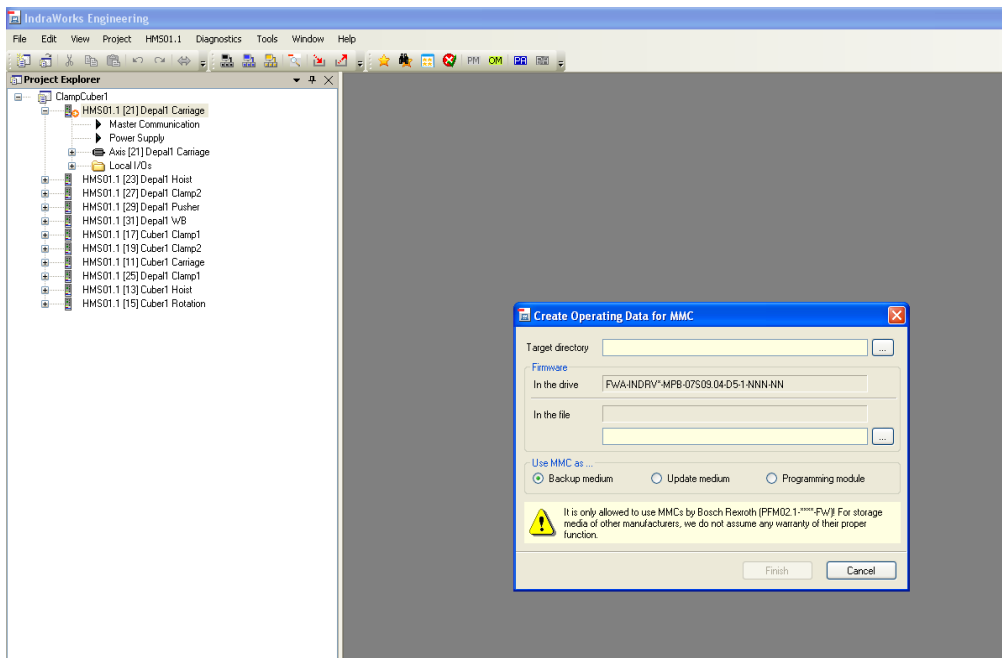
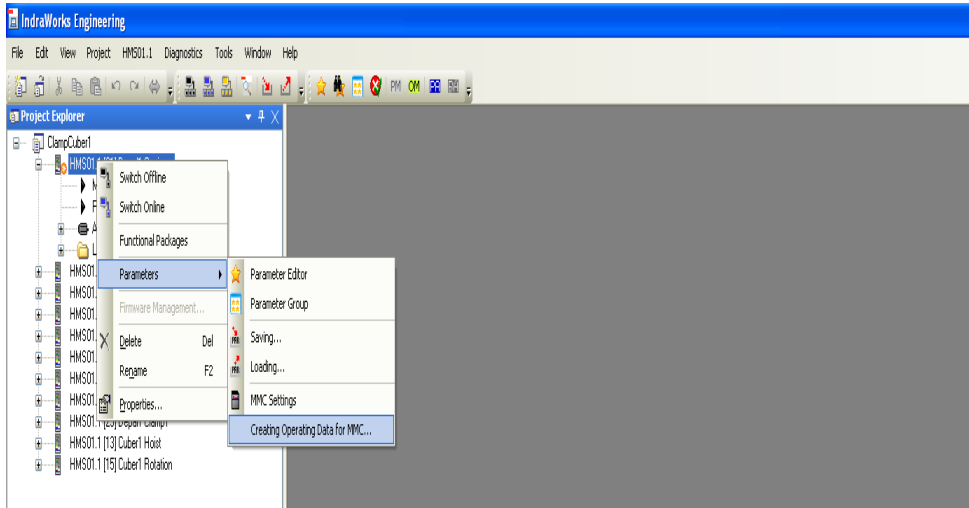
CATION: Decel must be set steep enough to stop axis before safety relay has timed out! Removing power to the safety inputs before the axis has stopped allows the axis to free-wheel to the end of travel.



SAVING DRIVE PARAMETERS:



LOADING PARAMETERS IN MMC CARD:

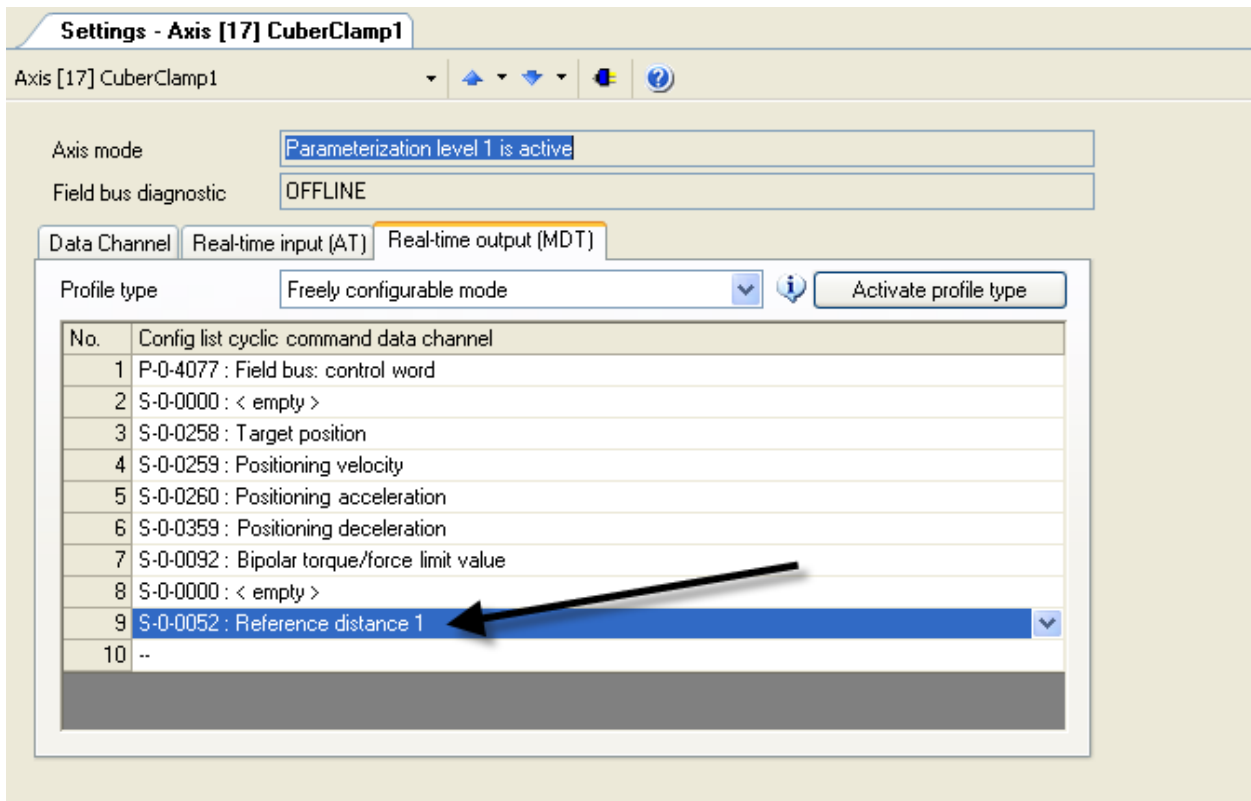


APPENDIX:

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).



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

Data Reference Motor Encoder - Axis [17] CuberClamp1

This value will be written

Axis [17] CuberClamp1

Direction of motion

- Clockwise
- Anti-Clockwise



Position

Position feedback value mm
Reference Distance mm

Evaluation of

- Reference Mark (Zero Pulse)
- Home Switch
 - positive slope
- Limit switch as zero switch
- Positive stop as zero switch

All Unchecked

Cam switch point shifted to mm

Home switch offset mm

Homing

Velocity mm/s
Acceleration mm/s²
FeedRate Override %
Position Window mm
Jerk limit bipolar mm/s³

When homing ends

- Stop
- position on reference point

Offset mm

Motor encoder in reference

System reference

- Motor encoder
- Optional encoder

System in reference

Clear position status

Drive Controlled Homing

B: Scaling Data From Mechanical Engineering:

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

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

	S-0-0121, Input rev of load gear n1	1	
	S-0-0122, Output rev of load gear n2	1	
Marshalling Pusher	S-0-0278, Maximum Travel Range	10000	mm
	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

Switching On

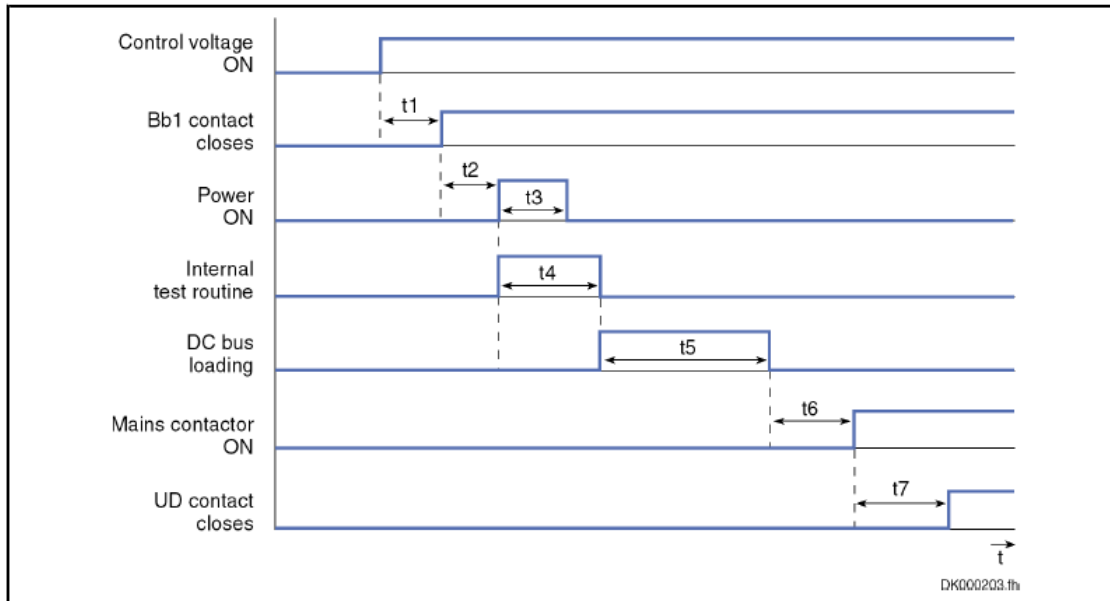


Do not switch on HMV supply units simultaneously!

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.



- t1 5.2 s; time for internal booting until Bb1 contact closes
- t2 Time can be set by the user. Take the time into account which is required for run-up of all devices connected to the module bus. This time depends on the control unit or the machine.
- t3 at least 250 ms; switch-on pulse
- t4 500 ms; time for internal test routines before the DC bus is loaded
- t5 time depends on DC bus capacitance (internal, external) and mains voltage
- t6 500 ms; delay time until mains contactor closes
- t7 maximum 200 ms; depends on device (ON delay of mains contactor)

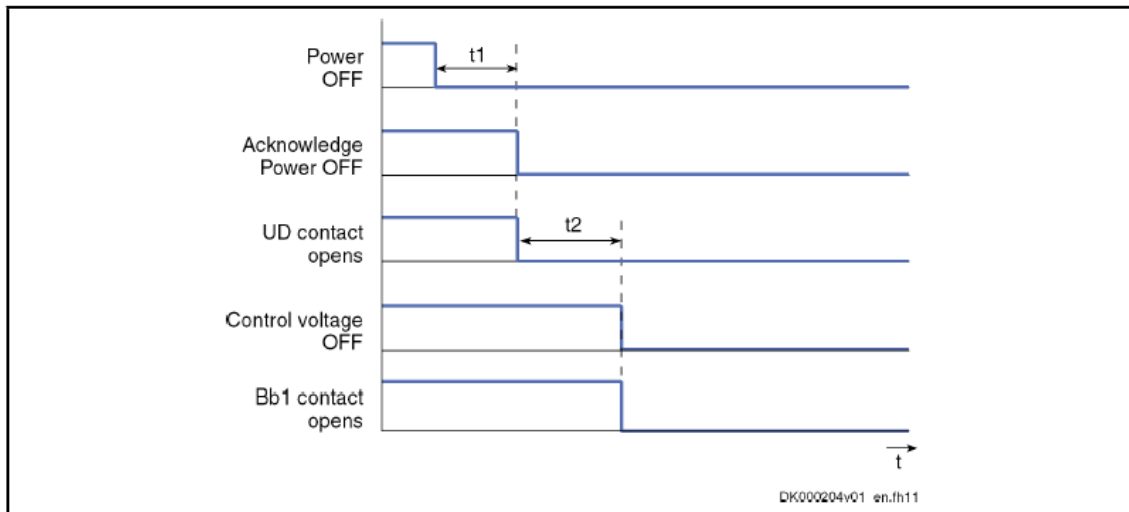
Fig.9-13: Time behavior when switching on

Involved Connection Points



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

Switching Off



t1 maximum 200 ms; depends on device (OFF delay of mains contactor)

t2 time can be set by the user

Fig.9-14: Time behavior when switching off



Damage to the supply unit!

At HMV01.1R supply units, there must be at least 10 ms between the request mains OFF (signal at X32.6 / X32.7) and the disconnection of the mains voltage, so that the energy flow has been interrupted when the disconnection process starts.

You can make sure this order is observed by appropriate switch elements (e.g. by a main switch of the control cabinet with leading auxiliary contact). For this purpose, connect the auxiliary contact in series with mains 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.

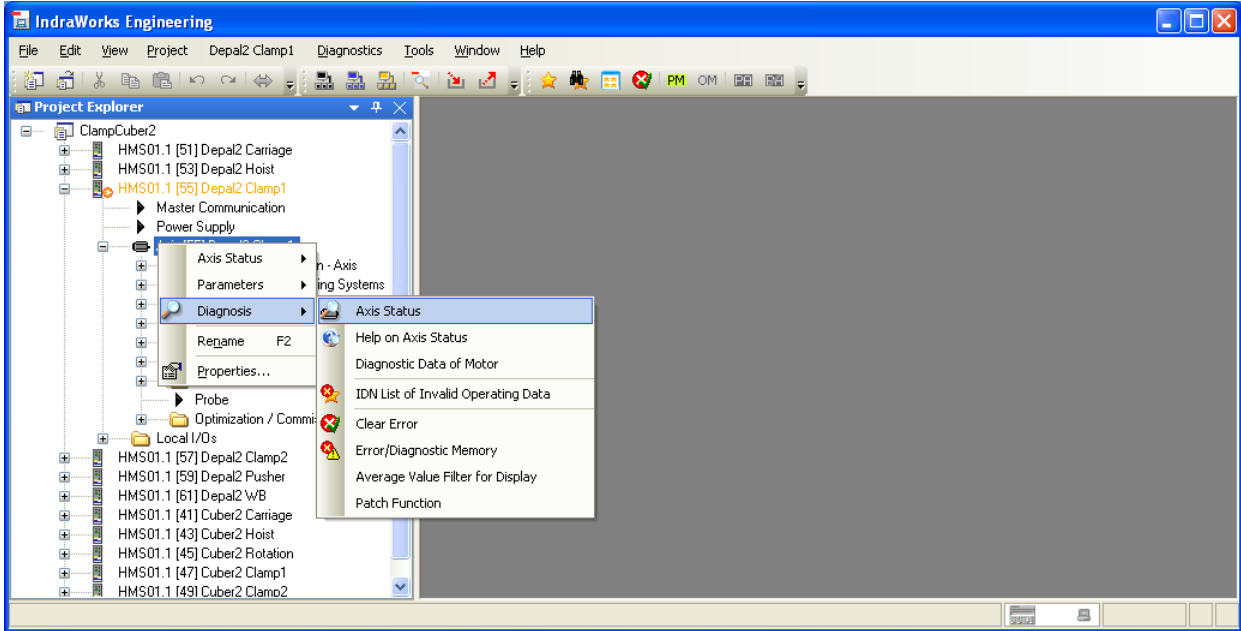
“Power On” status is achieved by closing the circuit between terminals 6 and 7 of terminal group X32 on the Servo Drive control section.

“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.

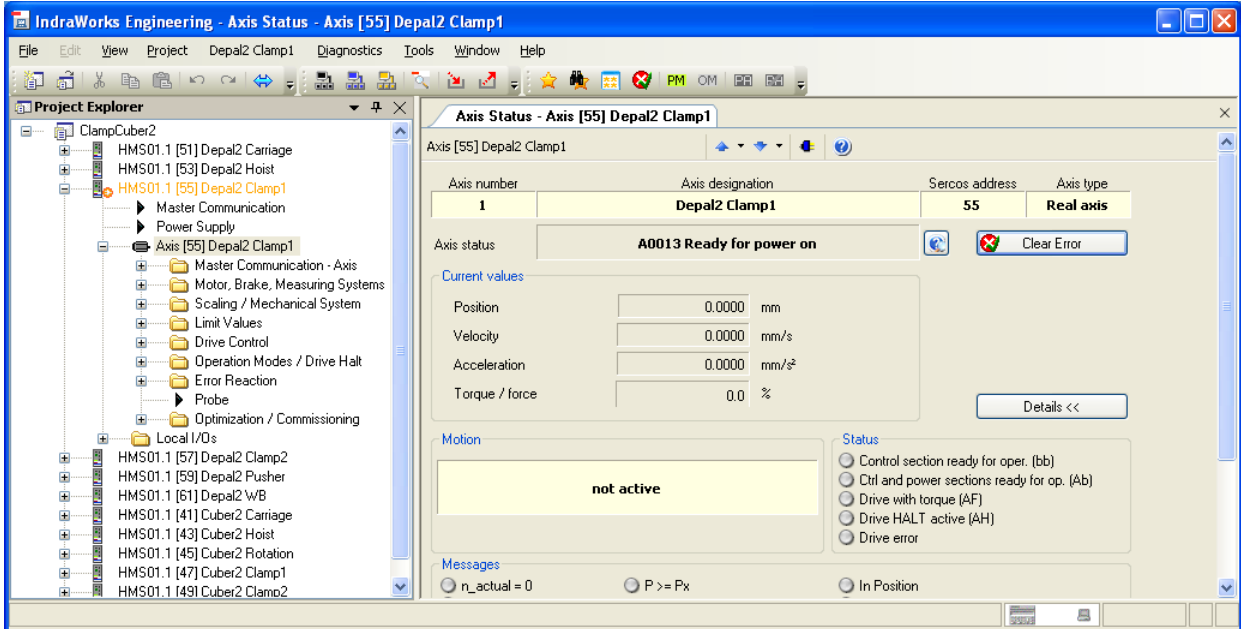
“Safe Torque Off” status is achieved by opening the circuit to terminal 3 and closing the circuit to terminal 2 of terminal group X41 on the Servo Drive control section.

D: TROUBLE SHOOTING

To monitor Drive Status click on “Axis Status”.



Axis Status:



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.

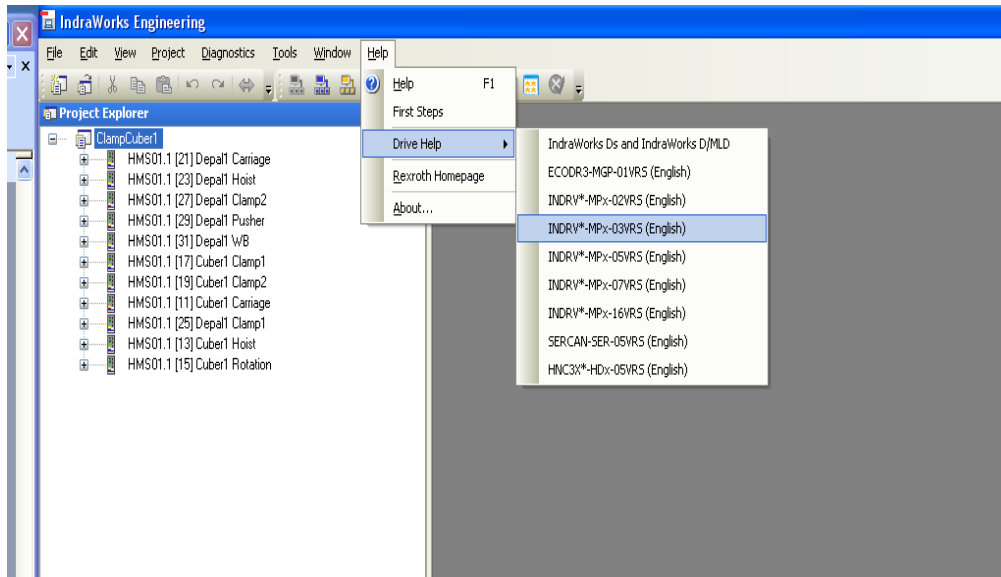
F8023 – “Mechanical Link W/Encoder”: Caused by loose of connection between Encoder and Drive Control Section. Power Supply must be Off to clear error after problem has been corrected.

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

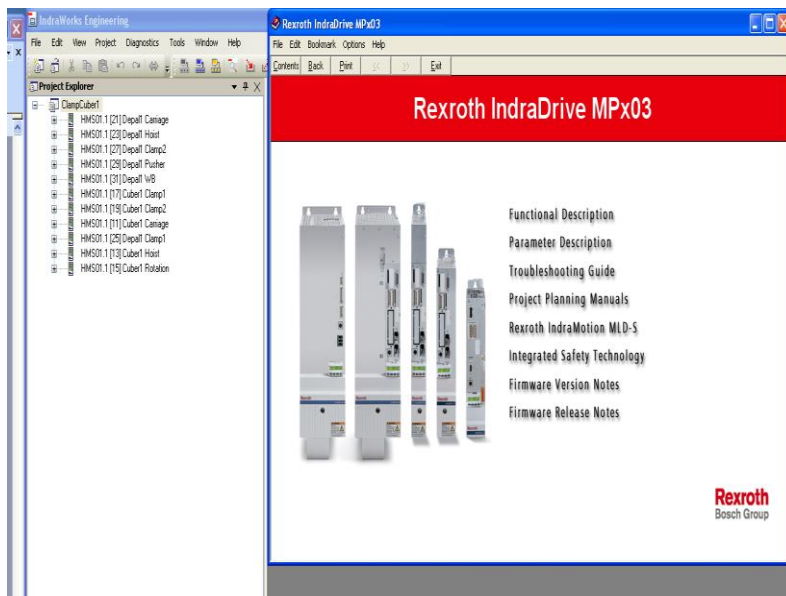
F8060 – “Over current in Power Section”: Typically caused by short in motor or motor cable. If motor and cable are OK Drive Control Unit may be defective. Test by disconnecting motor and see if fault clears. If not disconnect cable from Drive Power Section (A1,A2,A3) and see if fault clears.

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

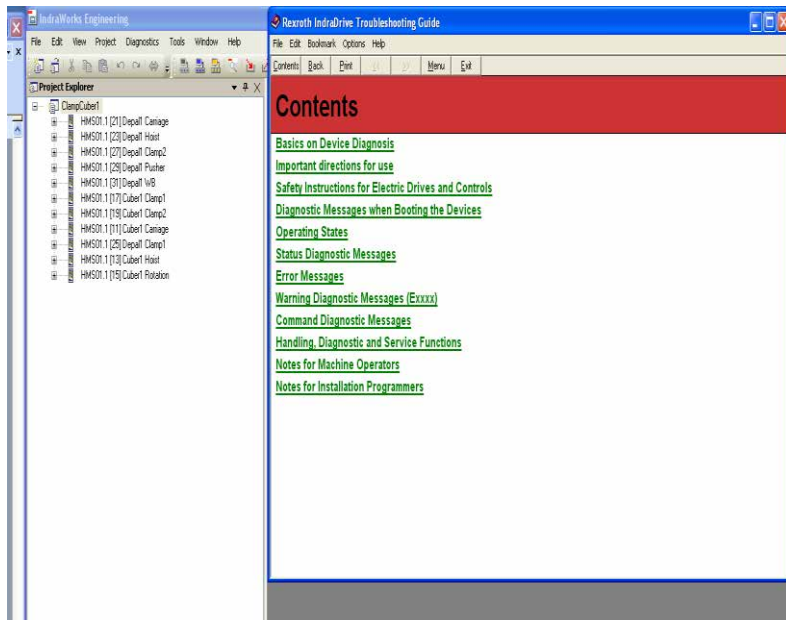
REFER TO INDRAWORKS HELP FOR ADDITIONAL FAULT CODES INFORMATION AS SHOWN ON NEXT PAGE:



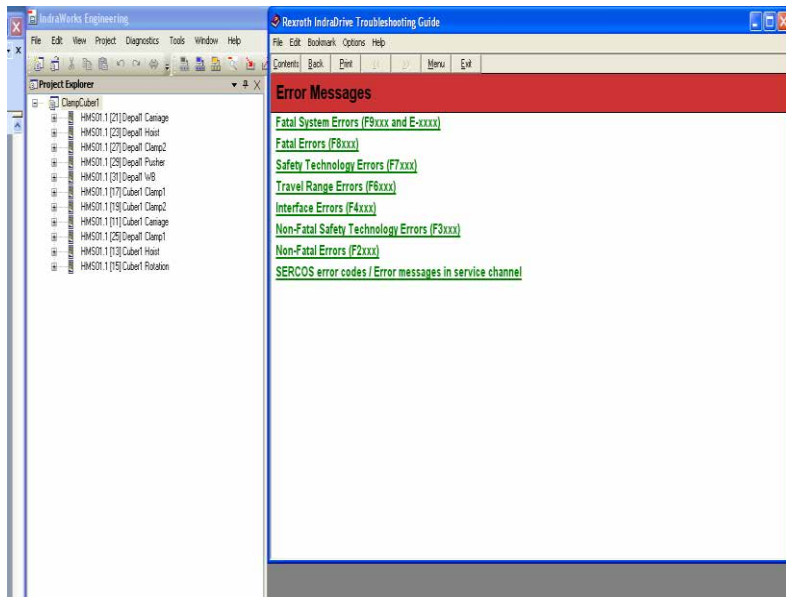
Choose “Troubleshooting Guide”:



Choose “Error Messages”:



Choose appropriate category below:



E: CONTROL WORD DEFINITIONS


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

P-0-4077 Field Bus Control Word.pdf - Adobe Reader

Structure

Bit	Designation/function	Comment
0	Command value acceptance Upon a change (S-0-0346, bit 0) - a positioning block is activated or - the command position is accepted	Not supported in profile 0xFFFD (see P-0-4084)
1	Operating mode setting 0->1: Change to operating mode 1->0: Change to parameter mode	
2	Going to zero (S-0-0148) 0->1: Start homing command "C6" 1->0: Complete homing command "C6"	Not supported in profile 0xFFFD (see P-0-4084)
3	Absolute / relative (S-0-0346, bit 3) (only effective when using "S-0-0282, Positioning command value") 0: Positioning command value (S-0-0282) is processed as absolute target position in the drive 1: Positioning command value (S-0-0282) is processed as relative travel distance in the drive	Not supported in profile 0xFFFD (see P-0-4084)
4	Immediate block change (S-0-0346, bit 5) (only effective when using "S-0-0282, Positioning command value") 0: Positioning command value (S-0-0282) is only applied after the last active target position was reached 1: Positioning command value (S-0-0282) is immediately applied upon toggling of command value acceptance	Not supported in profile 0xFFFD (see P-0-4084)
5	Clear error (S-0-0099) 0->1: Start error clearing command "C5" 1->0: Complete command "C5"	
7/6	Positioning / jogging (S-0-0346, bit 2 + S-0-0346, 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)	Not supported in profile 0xFFFD (see P-0-4084)
9/8	Command operation mode (for SERCOS: S-0-0134, bit 8...9) 00: Primary operation mode 01: Secondary oper. mode 1 (e.g., jogging) 10: Secondary oper. mode 2 11: Secondary oper. mode 3	
12	IPOSYNC Interpolator clock (only in cycl. pos. control): Toggles when new command values transmitted	
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!)	
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

 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](#)

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P-0-4078, Field bus: status word (Drive to PLC)

P-0-4078 Field Bus Status Word.pdf - Adobe Reader

Edt View Document Tools Window Help

1 / 2 100% Find

Structure

The individual 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) (S-0-0403, bit 0) actual position value (encoder 1 or 2) is 0: Relative 1: Homed	
3	In standstill (S-0-0331, bit 0) 1: Actual velocity < standstill window S-0-0040 < S-0-0124	
4	Command value reached for Velocity control 1: Command speed reached (S-0-0330, bit 0) ... Cyclic position control 1: In position (S-0-0336, bit 0) ... Drive-internal interpolation 1: [(S-0-0258) - (S-0-0051/53)] S-0-0057 (S-0-0437, bit 1) ... Drive-controlled positioning 1: [(S-0-0430) - (S-0-0051/53)] S-0-0057 and "in position" (S-0-0336, bit 0) and "Nfeedback = 0" (S-0-0331, bit 0); (S-0-0437, bit 2) ... Positioning block mode 1: "End position reached" (P-0-4061, bit 4) Other operation modes: 1: "Target position attained" (S-0-0342, 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 (P-0-0116, bit 8...9) 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 (S-0-0419, bit 0), the drive acknowledges the acceptance of the "positioning command value" (S-0-0282).	
11	Class 3 diagnostics message (cf. S-0-0013) The bit is set if a class 3 diagnostics message is present.	
12	Class 2 diagnostics warning (cf. S-0-0012) The bit is set if a class 2 diagnostics warning is present.	
13	Class 1 diagnostics drive error (cf. S-0-0011) 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: Control section and power section ready for op. ("Ab") 11: In operation, with torque (e.g. "AF")	

P-0-4078, Field bus: Status word

[P-0-4078 - Attributes](#)

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