

ClearPath-IP User Defined Types (UDTs)

CPM_IP_Motor UDT

UDT Definition:

Tag Name	Data Type	Description
Controlword	CPM_IP_Controlword	The Controlword is used to enable the servo and control other features. See the Controlword UDT for more details.
Statusword	CPM_IP_Statusword	The Statusword contains real-time status information for the ClearPath-IP motor. See the Statusword UDT for more details.
ShutdownRegister	DINT	Real-time info on what shutdowns are present. See the ClearPath-IP Software Reference for a detailed breakdown of the Shutdown Register.
WarningRegister	DINT	Real-time info on what warnings are present. See the ClearPath-IP Software Reference for a detailed breakdown of the Warning Register.
MoveType	SINT	The Move Type dictates what type of move (e.g., position, velocity, homing, etc.) the motor will begin executing when the Move Number is set to a new value.
MoveTypeAck	INT	<p>The Move Type Ack is used to verify that the motor has received the move command. Upon a successful move command, the Move Type Ack will equal the Move Type.</p> <p>If a problem has occurred, the Move Type Ack will return an error code (Move Type Values ≥ 100). See the ClearPath-IP Software Reference for a detailed list of move type errors.</p>
MoveNumber	INT	Change this number to initiate a new move.
MoveNumberAck	INT	Returns the number of the move currently being executed.
MoveParam1	DINT	Contains one of the user-defined move parameters required for a move (e.g., position, velocity, acceleration, etc.). How this value will be used is determined by the Move Type.
MoveParam2	DINT	Contains one of the user-defined move parameters required for a move (e.g., position, velocity, acceleration, etc.). How this value will be used is determined by the Move Type.
MoveParam3	DINT	Contains one of the user-defined move parameters required for a move (e.g., position, velocity, acceleration, etc.). How this value will be used is determined by the Move Type.
MoveParam4	DINT	Contains one of the user-defined move parameters required for a move (e.g., position, velocity, acceleration,

		etc.). How this value will be used is determined by the Move Type.
PositionMeasured	DINT	The motor's real-time position in counts as measured by its internal encoder.
VelocityMeasured	DINT	The motor's real-time rotational speed in counts/second based on encoder feedback.
TorqueMeasured	INT	The instantaneous output torque currently being produced by the motor represented as a percentage of the motor's peak rated torque.
PositionTarget	DINT	The commanded position the motor is currently moving toward.
VelocityTarget	DINT	The commanded velocity that the motor is currently following.
ReadParamID	INT	The ID of the parameter you would like to read.
ReadParamValue	DINT	The value of the read parameter.
ReadParamIDEcho	INT	The ID of the parameter currently being read.
WriteParamID	INT	The ID of the parameter you would like to write.
WriteParamValue	DINT	The value that is written to the parameter.

CPM_IP_Controlword UDT

UDT Definition:

Tag Name	Data Type	Description
Enable	BOOL	Turn ON to request the motor to enable. When enabled, the servo energizes its windings and produces torque to follow its commanded motion.
ShutdownReset	BOOL	Turn ON momentarily to clear all shutdowns and move cancelled warnings from the motor. When the shutdowns have been successfully cleared, the Shutdown Reset Ack bit (Statusword bit 20) turns ON to confirm the reset was accepted. After receiving this acknowledgment, turn Shutdown Reset back OFF to complete the handshake.
ClearShutdownHistory	BOOL	Clears the stored shutdown history. Used only for diagnostics or testing.
ClearWarningHistory	BOOL	Clears the stored warning history. Used only for diagnostics or testing.
ExtPositiveLimit	BOOL	When ON, motion in the positive direction is stopped (acts like a positive limit switch). This bit is useful when a physical limit switch cannot be wired directly to the I/O HUB—for example, if the limit input is handled by the PLC instead.
ExtNegativeLimit	BOOL	When ON, motion in the negative direction is stopped (acts like a negative limit switch). This bit is useful when a physical limit switch cannot be wired directly to the I/O HUB—for example, if the limit input is handled by the PLC instead.

WriteParameter	BOOL	Turn ON to perform a parameter write via the Generic Parameter Interface. The motor will set the Write Parameter Ack bit (Statusword bit 27) when the write operation has completed successfully. After receiving this acknowledgment, turn Write Parameter back OFF to complete the handshake and allow future writes.
PauseParameterReading	BOOL	Turn this bit ON to stop cyclically reading a parameter via the Generic Parameter Interface.
StopAllMotion	BOOL	When ON, overrides all motion commands and commands the axis to decelerate to a stop.
Reserved1	BOOL	-----
Reserved2	BOOL	-----
Reserved3	BOOL	-----
Reserved4	BOOL	-----
Reserved5	BOOL	-----
Reserved6	BOOL	-----
Reserved7	BOOL	-----
Reserved8	BOOL	-----

CPM_IP_Statusword UDT

UDT Definition:

Tag Name	Data Type	Description	
		1 (ON / High)	0 (OFF / LOW)
Enabled	BOOL	Motor windings energized.	Motor is disabled/de-energized.
ReadyForCommand	BOOL	Servo is ready to receive motion commands.	Motor is disabled, shutdown, or startup sequence is in process
ShutdownPresent	BOOL	The motor is in a shutdown state. Refer to the Motor Shutdown Register to determine the cause.	No shutdowns present.
WarningPresent	BOOL	The motor has non-critical warning(s) present. Refer to the Motor Warning Register for details.	No warnings present.
InRange	BOOL	The motor's actual position is within the configured "In-Range Window" of its commanded position. <i>(Configured in ClearView)</i>	The motor's position error exceeds the In-Range Window.
CommandComplete	BOOL	The motor is enabled and there is no motion being commanded.	A motion command is executing or the motor is shutdown/disabled.

Settled	BOOL	The motor is In Range and Command Complete for the “Settled Verify Time”. <i>(Configured in ClearView)</i>	The motor is moving, or no longer within the In-Range Window.
AtSpeed	BOOL	The motor is moving, and its actual velocity is within the configured “Velocity Window” of the target velocity. <i>(Configured in ClearView)</i>	The velocity error exceeds the Velocity Window, the motor is not moving, or the motor is homing.
Homing	BOOL	Homing routine in progress	The motor is not homing.
HasHomed	BOOL	Homing has completed successfully.	Motor has not homed since power-up.
BrakeReleased	BOOL	The I/O HUB output assigned to the external brake is active, releasing the brake. <i>(If no brake output is configured for this motor, this bit remains ON by default.)</i>	The external brake is deenergized and is holding the load.
Reserved1	BOOL	----	----
Reserved2	BOOL	----	----
Reserved3	BOOL	----	----
Reserved4	BOOL	----	----
AtTargetPosition	BOOL	The motor is Settled at its target position. Indicates a position move has successfully completed. <i>Note: At Target Position only applies for positional moves.</i>	The motor is moving, or was prevented from reaching its target position.
FollowingConfigured	BOOL	This motor is configured to follow another axis.	The motor is not configured for following.
ActivelyFollowing	BOOL	This motor is currently following a master axis.	The motor is not following.
IsFollowed	BOOL	Other motor(s) are configured to follow this motor.	This motor has no followers.
MoveCanceled	BOOL	The last move was cancelled. Refer to the Motor Warning Register to determine the cause.	----
ShutdownResetAck	BOOL	Motor Shutdowns were cleared successfully. Used to handshake with Controlword bit “Shutdown Reset”.	----
InHomeSensor	BOOL	Motor’s home sensor is active.	Motor’s home sensor is not configured or inactive.
AllMotionBlocked	BOOL	Motion on this axis is blocked because either the Stop Sensor	----

		is active or Controlword bit “Stop All Motion” is active.	
InPositiveLimitSwitch	BOOL	The motor’s positive limit input on the I/O HUB is active, or the Controlword bit “Ext Positive Limit” is ON.	-----
InNegativeLimitSwitch	BOOL	The motor’s negative limit input on the I/O HUB is active, or the Controlword bit “Ext Negative Limit” is ON.	-----
InPositiveSoftwareLimit	BOOL	The motor’s position meets or exceeds the positive software position limit. <i>Note: Soft limits only apply after the motor has homed.</i>	Soft limit hasn’t been reached, motor has not been homed, or soft limits have not been configured.
InNegativeSoftwareLimit	BOOL	The motor’s position meets or exceeds the negative software position limit. <i>Note: Soft limits only apply after the motor has homed.</i>	Soft limit hasn’t been reached, motor has not been homed, or soft limits have not been configured.
WriteParameterAck	BOOL	A parameter write was successful. Used to handshake with Controlword bit “Write Parameter”.	-----
PositionCaptureSensorState	BOOL	The motor’s position capture sensor is active.	Motor’s position capture sensor is not configured or inactive.
MotorModelType	BOOL	Motor model is either IPSK or IPHP.	Motor model is IPVC.
Reserved5	BOOL	-----	-----
MotorConnected	BOOL	Motor is connected and communicating with the I/O HUB.	Motor is disconnected from the I/O HUB, or has communication problems.

IO_HUB_IO UDT

UDT Definition (*NOTE: Only for IO-HUB-4-E*):

Tag Name	Data Type	Description
DigitalInputs	INT	Bit-mapped digital inputs (I/O-0 through I/O-12). Each bit represents one input.
AnalogInputs	INT[13]	A 13-element array where each element corresponds to one analog input (I/O-0 through I/O-12). Each value is the measured voltage of that input in millivolts (mV). Points not configured as analog inputs will always report a value of zero.

DigitalOutputs	INT	Bit-mapped digital outputs (I/O-0 through I/O 11). Setting a bit to 1 energizes the corresponding output.
AnalogOut_IO12_uA	INT	Represents the commanded output current for I/O-12 when it is configured as an Analog Output in ClearView. The value is expressed in microamps (μ A) and must be within the range 0 20,000 μ A, corresponding to 0-20 mA of output current.
PWM_DutyCycles	INT[12]	A 12-element array where each element corresponds to one output point (I/O-0 through I/O-11). Each value sets the commanded PWM duty cycle for that point, where 0 = 0% and 255 = 100%. Only points configured for PWM operation in ClearView use this value; for all other output types, the array element is ignored.
IO_Config_ReadOnly	LINT	A read-only register that reports how each I/O point is configured in ClearView. It is provided for diagnostic purposes and is not generally needed in control logic.

IO_HUB_Encoder UDT

UDT Definition (*NOTE: Only for IO-HUB-4-E*):

Tag Name	Data Type	Description
Position	DINT	The measured encoder position in counts.
Velocity	DINT	The measured encoder velocity in counts/second.
IndexPosition	DINT	The position of the encoder's index in counts.
AlarmFlag	BOOL	This bit is used to identify an error with the encoder. Possible causes include: encoder frequency above max spec or encoder electrical noise.
AddToPositionAck	BOOL	This value is set to true whenever the Add To Position is set to a non-zero value, and when true, it prevents the encoder number space from changing.
AddToPosition	DINT	When this value is non-zero and the Add to Position Ack is deasserted, then the encoder position will be adjusted by the specified amount and the Add To Position Ack will be asserted.