



Specifications

USC2000 Servo Controller For AutomationDirect™ PLC

Operational Modes:	Position, Velocity and Torque Provides Trajectory generator and servo loop closure.
Servo Update Time:	345 micro sec (254 μ sec optional)
PID Filter:	Programmable Gain, Reset, and Rate coefficients, 16 bits.
Velocity Range:	0 to 16,383 counts/sample
Acceleration Range:	0 to 16,383 counts/sample/sample
Position Range:	-1,073,741,824 to +1,073,741,823 counts
Servo Control Commands:	40 high level
I/O:	4 OPT Isolated inputs, 5-24 volt, AC or DC polarity NOT DEPENDED. 3 outputs, 48v, 300 ma (solenoids and relays)
ENCODER:	Incremental TTL and Differential ch. A, ch. B, and INDEX (A, \bar{A} , B, \bar{B} , INX, \bar{INX}) Pulse Rate - 800 kHz, (1.00 mHz optional)
POWER:	12 vac, 300 ma from external XFRMR or supplied by PLC03 or MicroIPC05 when connected.
DIMENSIONS:	3.00 x 4.75 PCB without Heat Sink 3.25 x 6.00 x 1.50 when mounted on "L" shaped heat sink
TEMPERATURE:	-55°C to +150°C Storage, 0°C to 50°C Operating
FEATURES:	<ul style="list-style-type: none"> • Index finding on Mechanical Stop of LIMIT SWITCH • 64 position "TEACH" mode using internal EEprom storage • Can be configured to be completely STAND ALONE • Programmable ERROR detection with motor OFF or FLAG to PLC (will detect ENCODER problem or motor out of control) • Additional Encoder FAN OUT connector (for Electronic gearing) • RLL programming for stand alone applications • On Board 3A, 48V Driver for PM DC motor or ±10VDC output for external Servo amplifier (most industry standard servo amplifiers are supported) • Programming via Relay Ladder Logic ONLY • All servo commands and parameters are executed thru PLC registers • All communications TO and FROM servo are completely transparent AND does not require any PLC programming. • 2 controllers per PLC for X-Y point-to-point positioning.

OPTIONS

I/O Expanders:	8 opto isolated INPUTS, 5-24 VDC or VAC 7 120VAC, 5A Relay Outputs OR 4 opto isolated INPUTS, 5-24 VDC or VAC 4 TTL INPUTS (or dry contact closure) 4 120 VAC, 5A RELAY OUTPUTS 3 high current SOLENOID and RELAY drivers
Operator Interface:	LCD with backlit 20x4 characters 16 keys keypad
Analog I/O:	2 inputs, differential or single ended, jumper selected 0-20ma, 4-20ma, 0-5v 2 outputs 0-20ma or 4-20ma
T/C or Millivolt Input Board:	On board cold junction compensation and linearization 6 ch. of type J, K, or T - 12 bits OR 6 ch. of 0-50 mv or 0-5 v
Aux Processor Configured For:	PID Module: 2 PID's with high current drivers for SSR's or Contactors 16 LED's for panel indicators (includes 7 high current relay OR lamp drivers) Stepper motor pulse generator with programmable Position Velocity AND Acceleration.

TB1

1	MTR +
2	MTR -
3	36VDC+
4	GND
5	12VAC
6	12VAC
7	INP COMMON
8	INP0
9	INP1
10	INP2 HOME
11	INP3 AUX
12	14VDC OUT (for user devices)

P1—TTL encoder connector

1	GND
2	INDEX
3	ch. A
4	5V+
5	ch.B

P2—Differential encoder connector

1	GND	2	GND
3	\overline{INX}	4	INX
5	\overline{A}	6	A
7	5V+	8	5V+
9	\overline{B}	10	B

TB2

1	GND
2	14VDC OUT (for user devices)
3	COM
4	COM
5	AUX0 OUT
6	AUX1 OUT
7	CMPL OUT
8	GND
9	VISO-
10	VISO+
11	ISO GND
12	REF+ (out $\pm 10v$)

JUMPERS

JP1—OPTO Isolator Option for $\pm 10V$ reference:

JP1 Installed: No OPTO Isolator option

JP1 NOT Installed: OPTO Isolator option installed

JP2—Select Encoder Index Polarity:

JP2 in position 1: Positive Encoder Index

JP2 in position 3: Negative Encoder Index

COMMAND REFERENCE

PLC03 or MicroIPC05 command format (BYTES)

CMDByte POS0 POS1 POS2 POS3 VEL1 VEL2 ACCEL1

Note: VEL0, VEL3, ACCEL0, ACCEL2, and ACCEL3 are internal bytes and normally set to 0. See CMD 232 and 233 for more details.

COMMAND BYTES

0-63	"play back"	
64-127	recorded from realPosition	
128-191	recorded from positionSp	
199	STT	Do not use.
200	NOP	Dummy STROBE
201	STOP	Stop with decel = accel
202	STOP_ABRUPT	Stop with max. decel
203	MTR_OFF	Disable motor driver (mtr will free spin)
204	PID_PARMS	Load PID filter from POS0, 1, 2, 3, and VEL1, 2
205	ABS_MOV	Move to position absolute
206	REL_MOV	Move to position relative
209	VEL_CW	Velocity move, CW
210	VEL_CCW	Velocity move, CCW
211	REL_MOV_HOME_RST	Same as "REL_MOV" but reset position CTR to 0 to prevent overflow on long runs
207	INDEX_TBL_MODE	Enter into INDEX mode of operation
208	RST_IND_X_TBL_MODE	Resets above command
212	SPAR_2	Future
213	TORQ_CW	Torque move CW, Torque value is a 0–128 programmed into the "VEL1" byte
214	TORQ_CCW	Torque move CCW, Torque value is 0–128 programmed into the "VEL1" byte
215	HOME_CW	Find INDEX moving CW after mechanical stop is detected, with Torque value (0–255) programmed into the "VEL1" byte. Note: position CTR is reset to 0 (HOME).
216	HOME_CCW	Find INDEX moving CCW after mechanical stop is detected with Torque value (0–255) programmed into the "VEL1" byte. Note: Position CTR is reset to 0 (HOME).
217	HOME_LS_CW	Find INDEX moving CW after LS_HOME is detected (INP2_HOME). Note: position CTR is reset to 0 (HOME).
218	HOME_LS_CCW	Find INDEX moving CCW after LS_HOME is detected (INP2_HOME). Note: position CTR is reset to 0 (HOME).
219	DEF_HOME	Position CTR is reset to 0 (HOME).
220	RDRP	Reads real POSITION.
221	RDRV	Reads real VELOCITY.
222	RDRP_RDRV	Reads real POSITION and real VELOCITY.
224	RSTI_ALL	Do not use.
225	BCD_MODE	Bytes in PositionSP treated as 4 pairs of BCD digits (XX XX XX XX for PLC03). Note: real POS not affected.
226	BCD1_MODE	Bytes in PositionSp treated as BCD digits (XX X X XX for PLC03). Note: real POS not affected.
227	BCD_MODE_OFF	Disable BCD or BCD1 modes above.
228	POS_ERR_STOP	Get ERROR count from POS0 and POS1 to disable the MTR when ERROR is present.
229	POS_ERR_FLAG	Get ERROR count from POS0 and POS1 to set ERROR flag for PLC only.
230	LOAD_CONFIG	Get CONFIG byte from POS0
231	LOAD_ENG_SCALE	Get scale factors from POS0, 1, 2, and 3 same as "LOAD_CONFIG" but only 1 flag
232	LOAD_MISSING_VEL_BYTES	Get velByte0 from POS0 byte and get velByte3 from POS1 byte.
233	LOAD_MISSING_ACC_BYTES	Get ACCEL0 from POS0 byte, get ACCEL2 from POS1 byte, and get ACCEL3 from POS2 byte.
234	EXT_STRB_ENBL	Enable external strobe (from INPUT3-AUX).
235	EXT_STRB_DSBL	Disable external strobe.
236	NO_STRB_MODE	Strobe IS NOT required (helps to update some parms without STROBE).
237	STRB_MODE	Strobe required (default).