



Integrated Systems and Control
Research and Development
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DATE: August 5, 2003
TO: MCB180 with Modbus Users
FROM: Ron Follmer
RE: Modbus Registers Defined for use with MCB180-Modbus Board

The MCB180, may now be supplied with the Modbus RTU Protocol on it's RS485 network port. When used in this configuration, it is compatible with the PCM400N, PCM400I, and PCMNET controls from ISAC.

Configuring the PCM series control for use with the MCB180

The MCB180 must be defined as a Modbus Slave device, it cannot function as a Modbus Master. Define the MCB180 as a "Generic" Modbus slave, not an "ISAC Smart" device, because the MCB180 does not have the same Point/Rule programming as the PCM series controls do. ISAC Smart devices must have this compatibility and have the ability to interact with the users with a full user interface. Therefore the MCB180 functions as a generic Modbus slave device.

The MCB180 provides the ability to exchange data via 16-bit Interger format or the IEEE 32-bit Floating Point format the same as the PCM series controls. To use that feature, the PCM Slave definition must specify that the "High Word First" word order must be assumed for the MCB180.

Configuring the PCM series control Register Definitions

The MCB180 I/O can be accessed using the REG Definitions of the PCM Series controls.

Note: "(RO)" means Read Only, the user should not attempt to modify via the network.

DI type registers

DI 1	(RO) Universal Input digital status. ON if AI 1 input voltage is < 2.5VDC
DI 2	(RO) Universal Input digital status. ON if AI 2 input voltage is < 2.5VDC
DI 3	(RO) Universal Input digital status. ON if AI 3 input voltage is < 2.5VDC
DI 4	(RO) Universal Input digital status. ON if AI 4 input voltage is < 2.5VDC
DI 5	(RO) Universal Input digital status. ON if AI 5 input voltage is < 2.5VDC
DI 6	(RO) Universal Input digital status. ON if AI 6 input voltage is < 2.5VDC
DI 7	(RO) Universal Input digital status. ON if AI 7 input voltage is < 2.5VDC
DI 8	(RO) Universal Input digital status. ON if AI 8 input voltage is < 2.5VDC
DI 9	(RO) Status digital input terminated at RLY180 DI 1

DI 10	(RO) Status digital input terminated at RLY180 DI 2
DI 11	(RO) Status digital input terminated at RLY180 DI 3
DI 12	(RO) Status digital input terminated at RLY180 DI 4
DI 13	(RO) Status digital input terminated at RLY180 DI 5
DI 14	(RO) Status digital input terminated at RLY180 DI 6
DI 15	(RO) Status digital input terminated at RLY180 DI 7
DI 16	(RO) Status digital input terminated at RLY180 DI 8
DI 17	(RO) Current DO 1 state (ON means DO is ON)
DI 18	(RO) Current DO 2 state (ON means DO is ON)
DI 19	(RO) Current DO 3 state (ON means DO is ON)
DI 20	(RO) Current DO 4 state (ON means DO is ON)
DI 21	(RO) Current DO 5 state (ON means DO is ON)
DI 22	(RO) Current DO 6 state (ON means DO is ON)
DI 23	(RO) Current DO 7 state (ON means DO is ON)
DI 24	(RO) Current DO 8 state (ON means DO is ON)
DI 25	(RO) Current DO 9 state (ON means DO is ON)
DI 26	(RO) Current DO 10 state (ON means DO is ON)
DI 27	(RO) Current DO 11 state (ON means DO is ON)
DI 28	(RO) Current DO 12 state (ON means DO is ON)
DI 29	(RO) Current DO 13 state (ON means DO is ON)
DI 30	(RO) Current DO 14 state (ON means DO is ON)
DI 31	(RO) Current DO 15 state (ON means DO is ON)
DI 32	(RO) Current DO 16 state (ON means DO is ON)
DI 33	(RO) Current DO 17 state (ON means DO is ON)
DI 34	(RO) Current DO 18 state (ON means DO is ON)
DI 35	(RO) Master Panel Override input of the MCB180 board

DO type registers

DO 1	Digital output DO 1 (RLY180 relay output 1)
DO 2	Digital output DO 2 (RLY180 relay output 2)
DO 3	Digital output DO 3 (RLY180 relay output 3)
DO 4	Digital output DO 4 (RLY180 relay output 4)
DO 5	Digital output DO 5 (RLY180 relay output 5)

DO 6	Digital output DO 6 (RLY180 relay output 6)
DO 7	Digital output DO 7 (RLY180 relay output 7)
DO 8	Digital output DO 8 (RLY180 relay output 8)
DO 9	Digital output DO 9 (RLY180 relay output 9)
DO 10	Digital output DO 10 (RLY180 relay output 10)
DO 11	Digital output DO 11 (RLY180 relay output 11)
DO 12	Digital output DO 12 (RLY180 relay output 12)
DO 13	Digital output DO 13 (RLY180 relay output 13)
DO 14	Digital output DO 14 (RLY180 relay output 14)
DO 15	Digital output DO 15 (RLY180 relay output 15)
DO 16	Digital output DO 16 (RLY180 relay output 16)
DO 17	Digital output DO 17 (RLY180 relay output 17)
DO 18	Digital output DO 18 (RLY180 relay output 18)

DO registers 1-18 will cause the programmed control Point specified in the Register Definition to directly cause the corresponding output of the MCB180 to change. If the control Point is ≥ 1.0 or ON then the DO# of the MCB will be turned ON.

AI type Integer (W word) formatted registers. These are all (RO) registers.

AI 1	AI 1, Current scaled value in signed Integer format
AI 2	AI 2, Current scaled value in signed Integer format
AI 3	AI 3, Current scaled value in signed Integer format
AI 4	AI 4, Current scaled value in signed Integer format
AI 5	AI 5, Current scaled value in signed Integer format
AI 6	AI 6, Current scaled value in signed Integer format
AI 7	AI 7, Current scaled value in signed Integer format
AI 8	AI 8, Current scaled value in signed Integer format

PI Integer (W word) formatted registers, address 1-128 (Modbus holding registers), (all RO).

PI 1	Binary programmed state of outputs (internal use)
PI 2	(internal use)
PI 3	Binary current load state of outputs (internal use)
PI 4	(internal use)

PI 5	Binary current status input states (internal use)
PI 6	(internal use)
PI 7	Binary universal input states (internal use)
PI 8	(internal use)
PI 9	AI 1, Current scaled value in signed Integer format
PI 10	AI 2, Current scaled value in signed Integer format
PI 11	AI 3, Current scaled value in signed Integer format
PI 12	AI 4, Current scaled value in signed Integer format
PI 13	AI 5, Current scaled value in signed Integer format
PI 14	AI 6, Current scaled value in signed Integer format
PI 15	AI 7, Current scaled value in signed Integer format
PI 16	AI 8, Current scaled value in signed Integer format
PI 17	Mcb180 model and revision (internal use)
PI 18	Mcb180 model and revision (internal use)
PI 19	Mcb180 model and revision (internal use)
PI 20	Mcb180 model and revision (internal use)
PI 21	Mcb180 model and revision (internal use)
PI 22	Mcb180 model and revision (internal use)

PI/PO Integer (W word) formatted registers, address 129-256 (Modbus holding registers)

These registers are used for MCB180 configuration functions and are not to be used for general application purposes. They can be read or written.

PI/PO 129	Binary network fail states (internal use)
	Future
PI/PO 131	Binary no-chg network fail states (internal use)
	Future
PI/PO 133	Binary master panel override states (internal use)
	Future
PI/PO 135	Binary override mode states 1-4 (internal use)
PI/PO 136	Binary override mode states 5-8 (internal use)
	Future
	Future
	Future

	Future
	Future
	Future
PI/PO 143	Digital input control modes (internal use)
PI/PO 144	Digital input control modes (internal use)
PI/PO 145	Analog input control modes (internal use)
PI/PO 146	Analog input control modes (internal use)
PI/PO 147	Analog interval time (internal use)
PI/PO 148	Chan 1 PID update time (internal use)
PI/PO 149	Chan 1 PID integral time (internal use)
PI/PO 150	Chan 1 PID hostflags (internal use)
PI/PO 151	Chan 2 PID update time (internal use)
PI/PO 152	Chan 2 PID integral time (internal use)
PI/PO 153	Chan 2 PID hostflags (internal use)
PI/PO 154	Chan 3 PID update time (internal use)
PI/PO 155	Chan 3 PID integral time (internal use)
PI/PO 156	Chan 3 PID hostflags (internal use)
PI/PO 157	Chan 4 PID update time (internal use)
PI/PO 158	Chan 4 PID integral time (internal use)
PI/PO 159	Chan 4 PID hostflags (internal use)
PI/PO 160	Chan 5 PID update time (internal use)
PI/PO 161	Chan 5 PID integral time (internal use)
PI/PO 162	Chan 5 PID hostflags (internal use)
PI/PO 163	Chan 6 PID update time (internal use)
PI/PO 164	Chan 6 PID integral time (internal use)
PI/PO 165	Chan 6 PID hostflags (internal use)
PI/PO 166	Chan 7 PID update time (internal use)
PI/PO 167	Chan 7 PID integral time (internal use)
PI/PO 168	Chan 7 PID hostflags (internal use)
PI/PO 169	Chan 8 PID update time (internal use)
PI/PO 170	Chan 8 PID integral time (internal use)
PI/PO 171	Chan 8 PID hostflags (internal use)
PI/PO 172	(internal use)

	<p>Flag to Save EEPROM Parameters in MCB's EEPROM device</p> <p>Write value >0 to save, Only do once, Write value=0 to do nothing.</p> <p>Read anytime, value should always be 0 (except a few seconds after set).</p> <p>Configuration screen changes will set this register automatically.</p>
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PI/PO Floating Point (F) formatted registers, address 1001-1128 (Modbus holding registers)

These registers are available for applications use.

PI 1001	(RO) AI 1, Analog input value formatted as floating point number
PI 1003	(RO) AI 2, Analog input value formatted as floating point number
PI 1005	(RO) AI 3, Analog input value formatted as floating point number
PI 1007	(RO) AI 4, Analog input value formatted as floating point number
PI 1009	(RO) AI 5, Analog input value formatted as floating point number
PI 1011	(RO) AI 6, Analog input value formatted as floating point number
PI 1013	(RO) AI 7, Analog input value formatted as floating point number
PI 1015	(RO) AI 8, Analog input value formatted as floating point number
PI/PO 1017	AO 1, Analog output setpoint value formatted as floating point number
PI/PO 1019	AO 2, Analog output setpoint value formatted as floating point number
PI/PO 1021	AO 3, Analog output setpoint value formatted as floating point number
PI/PO 1023	AO 4, Analog output setpoint value formatted as floating point number
PI/PO 1025	AO 5, Analog output setpoint value formatted as floating point number
PI/PO 1027	AO 6, Analog output setpoint value formatted as floating point number
PI/PO 1029	AO 7, Analog output setpoint value formatted as floating point number
PI/PO 1031	AO 8, Analog output setpoint value formatted as floating point number
PI 1033	(RO) AO 1, Analog output current actual value as floating point number
PI 1035	(RO) AO 2, Analog output current actual value as floating point number
PI 1037	(RO) AO 3, Analog output current actual value as floating point number
PI 1039	(RO) AO 4, Analog output current actual value as floating point number
PI 1041	(RO) AO 5, Analog output current actual value as floating point number
PI 1043	(RO) AO 6, Analog output current actual value as floating point number
PI 1045	(RO) AO 7, Analog output current actual value as floating point number
PI 1047	(RO) AO 8, Analog output current actual value as floating point number

PI/PO Floating Point (F) formatted registers, address 1129-1256 (Modbus holding registers). These registers are for Internal Use Only.

PI/PO 1129	Chan 1 PID rate threshold %
PI/PO 1131	Chan 1 PID proportional band
PI/PO 1133	Chan 1 PID default setpoint
PI/PO 1135	Chan 1 PID override setpoint
PI/PO 1137	Chan 1 PID minimum input scaling value
PI/PO 1139	Chan 1 PID maximum input scaling value
PI/PO 1141	Chan 1 PID minimum AI volt/ma scaling value
PI/PO 1143	Chan 1 PID minimum AI volt/ma scaling value
PI/PO 1145	Chan 1 PID minimum output scaling value
PI/PO 1147	Chan 1 PID maximum output scaling value
PI/PO 1149	Chan 1 PID minimum output failsafe %
PI/PO 1151	Chan 1 PID maximum output failsafe %
PI/PO 1153	Chan 1 PID minimum output pulse width time
PI/PO 1155	Chan 1 PID maximum output pulse width time
PI/PO 1157	Chan 2 PID rate threshold %
PI/PO 1159	Chan 2 PID proportional band
PI/PO 1161	Chan 2 PID default setpoint
PI/PO 1163	Chan 2 PID override setpoint
PI/PO 1165	Chan 2 PID minimum input scaling value
PI/PO 1167	Chan 2 PID maximum input scaling value
PI/PO 1169	Chan 2 PID minimum AI volt/ma scaling value
PI/PO 1171	Chan 2 PID minimum AI volt/ma scaling value
PI/PO 1173	Chan 2 PID minimum output scaling value
PI/PO 1175	Chan 2 PID maximum output scaling value
PI/PO 1177	Chan 2 PID minimum output failsafe %
PI/PO 1179	Chan 2 PID maximum output failsafe %
PI/PO 1181	Chan 2 PID minimum output pulse width time
PI/PO 1183	Chan 2 PID maximum output pulse width time
PI/PO 1185	Chan 3 PID rate threshold %
PI/PO 1187	Chan 3 PID proportional band
PI/PO 1189	Chan 3 PID default setpoint

PI/PO 1191	Chan 3 PID override setpoint
PI/PO 1193	Chan 3 PID minimum input scaling value
PI/PO 1195	Chan 3 PID maximum input scaling value
PI/PO 1197	Chan 3 PID minimum AI volt/ma scaling value
PI/PO 1199	Chan 3 PID minimum AI volt/ma scaling value
PI/PO 1201	Chan 3 PID minimum output scaling value
PI/PO 1203	Chan 3 PID maximum output scaling value
PI/PO 1205	Chan 3 PID minimum output failsafe %
PI/PO 1207	Chan 3 PID maximum output failsafe %
PI/PO 1209	Chan 3 PID minimum output pulse width time
PI/PO 1211	Chan 3 PID maximum output pulse width time
PI/PO 1213	Chan 4 PID rate threshold %
PI/PO 1215	Chan 4 PID proportional band
PI/PO 1217	Chan 4 PID default setpoint
PI/PO 1219	Chan 4 PID override setpoint
PI/PO 1221	Chan 4 PID minimum input scaling value
PI/PO 1223	Chan 4 PID maximum input scaling value
PI/PO 1225	Chan 4 PID minimum AI volt/ma scaling value
PI/PO 1227	Chan 4 PID minimum AI volt/ma scaling value
PI/PO 1229	Chan 4 PID minimum output scaling value
PI/PO 1231	Chan 4 PID maximum output scaling value
PI/PO 1233	Chan 4 PID minimum output failsafe %
PI/PO 1235	Chan 4 PID maximum output failsafe %
PI/PO 1237	Chan 4 PID minimum output pulse width time
PI/PO 1239	Chan 4 PID maximum output pulse width time
PI/PO 1241	Chan 5 PID rate threshold %
PI/PO 1243	Chan 5 PID proportional band
PI/PO 1245	Chan 5 PID default setpoint
PI/PO 1247	Chan 5 PID override setpoint
PI/PO 1249	Chan 5 PID minimum input scaling value
PI/PO 1251	Chan 5 PID maximum input scaling value
PI/PO 1253	Chan 5 PID minimum AI volt/ma scaling value
PI/PO 1255	Chan 5 PID minimum AI volt/ma scaling value

PI/PO 1257	Chan 5 PID minimum output scaling value
PI/PO 1259	Chan 5 PID maximum output scaling value
PI/PO 1261	Chan 5 PID minimum output failsafe %
PI/PO 1263	Chan 5 PID maximum output failsafe %
PI/PO 1265	Chan 5 PID minimum output pulse width time
PI/PO 1267	Chan 5 PID maximum output pulse width time
PI/PO 1269	Chan 6 PID rate threshold %
PI/PO 1271	Chan 6 PID proportional band
PI/PO 1273	Chan 6 PID default setpoint
PI/PO 1275	Chan 6 PID override setpoint
PI/PO 1277	Chan 6 PID minimum input scaling value
PI/PO 1279	Chan 6 PID maximum input scaling value
PI/PO 1281	Chan 6 PID minimum AI volt/ma scaling value
PI/PO 1283	Chan 6 PID minimum AI volt/ma scaling value
PI/PO 1285	Chan 6 PID minimum output scaling value
PI/PO 1287	Chan 6 PID maximum output scaling value
PI/PO 1289	Chan 6 PID minimum output failsafe %
PI/PO 1291	Chan 6 PID maximum output failsafe %
PI/PO 1293	Chan 6 PID minimum output pulse width time
PI/PO 1295	Chan 6 PID maximum output pulse width time
PI/PO 1297	Chan 7 PID rate threshold %
PI/PO 1299	Chan 7 PID proportional band
PI/PO 1301	Chan 7 PID default setpoint
PI/PO 1303	Chan 7 PID override setpoint
PI/PO 1305	Chan 7 PID minimum input scaling value
PI/PO 1307	Chan 7 PID maximum input scaling value
PI/PO 1309	Chan 7 PID minimum AI volt/ma scaling value
PI/PO 1311	Chan 7 PID minimum AI volt/ma scaling value
PI/PO 1313	Chan 7 PID minimum output scaling value
PI/PO 1315	Chan 7 PID maximum output scaling value
PI/PO 1317	Chan 7 PID minimum output failsafe %
PI/PO 1319	Chan 7 PID maximum output failsafe %
PI/PO 1321	Chan 7 PID minimum output pulse width time

PI/PO 1323	Chan 7 PID maximum output pulse width time
PI/PO 1325	Chan 8 PID rate threshold %
PI/PO 1327	Chan 8 PID proportional band
PI/PO 1329	Chan 8 PID default setpoint
PI/PO 1331	Chan 8 PID override setpoint
PI/PO 1333	Chan 8 PID minimum input scaling value
PI/PO 1335	Chan 8 PID maximum input scaling value
PI/PO 1337	Chan 8 PID minimum AI volt/ma scaling value
PI/PO 1339	Chan 8 PID minimum AI volt/ma scaling value
PI/PO 1341	Chan 8 PID minimum output scaling value
PI/PO 1343	Chan 8 PID maximum output scaling value
PI/PO 1345	Chan 8 PID minimum output failsafe %
PI/PO 1347	Chan 8 PID maximum output failsafe %
PI/PO 1349	Chan 8 PID minimum output pulse width time
PI/PO 1351	Chan 8 PID maximum output pulse width time

(MCB180_Modbus_Register_Summary.doc)