

Modbus-TCP

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Setup Information

The following list indicates important setup information for running in Modbus TCP. Ensure that the master is setup with the same configuration.

- Port 502 - Modbus-TCP uses port 502. This is fixed.
- Holding register addressing depends on the system used. Refer to your modbus master documentation to understand the address format.
 - Additional information is below to list the most common address types
- Max holding registers for read and write is 16
- Use function code 0x10 for write single register. Function code 0x06 is not supported.
- All registers are 32-bit
 - Exceptions are the registers used directly in the CM1-T Library (IEC 61131-3).
- 32-bit word mapping is little endian

Holding Register List

Included below is a table which details the location and function of the CM1 Modbus registers.

The addresses included below are referenced to the Modbus data model (PLC address for read/write to holding registers)

Note: Even if Direct Control is not used the Direct Control feedback registers can be useful for reading back motor information.

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Motor Information

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
0	40001	Position Error (?95)	Yes	No
2	40003	Motor Position (?96)	Yes	No
4	40005	Motor Speed (?97)	Yes	No
6	40007	Motor Torque (?98)	Yes	No
8	40009	Motor Status (?99)	Yes	No

Variables

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
10	40011	V0	Yes	Yes
12	40013	V1	Yes	Yes
14	40015	V2	Yes	Yes
16	40017	V3	Yes	Yes
18	40019	V4	Yes	Yes
20	40021	V5	Yes	Yes
22	40023	V6	Yes	Yes
24	40025	V7	Yes	Yes
26	40027	V8	Yes	Yes
28	40029	V9	Yes	Yes
30	40031	V10	Yes	Yes
32	40033	V11	Yes	Yes
34	40035	V12	Yes	Yes
36	40037	V13	Yes	Yes
38	40039	V14	Yes	Yes
40	40041	V15	Yes	Yes

Direct Registers

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
42	40043	P0	Yes	Yes
44	40045	S0	Yes	Yes
46	40047	A0	Yes	Yes
48	40049	V0	Yes	Yes
50	40051	R0	Yes	Yes
52	40053	M0	Yes	Yes

Inputs/Outputs

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			

54	40055	Analog Output	Yes	Yes
56	40057	Input Status (?70)	Yes	No
58	40059	Output Status (?50)	Yes	Yes

Positions

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
200	40201	P0	Yes	Yes
202	40203	P1	Yes	Yes
204	40205	P2	Yes	Yes
206	40207	P3	Yes	Yes
208	40209	P4	Yes	Yes
210	40211	P5	Yes	Yes
212	40213	P6	Yes	Yes
214	40215	P7	Yes	Yes
216	40217	P8	Yes	Yes
218	40219	P9	Yes	Yes
220	40221	P10	Yes	Yes
222	40223	P11	Yes	Yes
224	40225	P12	Yes	Yes
226	40227	P13	Yes	Yes
228	40229	P14	Yes	Yes
230	40231	P15	Yes	Yes
232	40233	P16	Yes	Yes
234	40235	P17	Yes	Yes
236	40237	P18	Yes	Yes
238	40239	P19	Yes	Yes
240	40241	P20	Yes	Yes
242	40243	P21	Yes	Yes
244	40245	P22	Yes	Yes
246	40247	P23	Yes	Yes
248	40249	P24	Yes	Yes
250	40251	P25	Yes	Yes

R Registers

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
300	40301	R0	Yes	Yes
302	40303	R1	Yes	Yes
304	40305	R2	Yes	Yes
306	40307	R3	Yes	Yes
308	40309	R4	Yes	Yes
310	40311	R5	Yes	Yes
312	40313	R6	Yes	Yes
314	40315	R7	Yes	Yes

316	40317	P8	Yes	Yes
318	40319	P9	Yes	Yes
320	40321	R10	Yes	Yes
322	40323	R11	Yes	Yes
324	40325	R12	Yes	Yes
326	40327	R13	Yes	Yes
328	40329	R14	Yes	Yes
330	40331	R15	Yes	Yes
332	40333	R16	Yes	Yes
334	40335	R17	Yes	Yes
336	40337	R18	Yes	Yes
338	40339	R19	Yes	Yes
340	40341	R20	Yes	Yes
342	40343	R21	Yes	Yes
344	40345	R22	Yes	Yes
346	40347	R23	Yes	Yes
348	40349	R24	Yes	Yes
350	40351	R25	Yes	Yes

N Registers

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
400	40401	N0	Yes	Yes
402	40403	N1	Yes	Yes
404	40405	N2	Yes	Yes
406	40407	N3	Yes	Yes
408	40409	N4	Yes	Yes
410	40411	N5	Yes	Yes
412	40413	N6	Yes	Yes
414	40415	N7	Yes	Yes
416	40417	N8	Yes	Yes
418	40419	N9	Yes	Yes
420	40421	N10	Yes	Yes
422	40423	N11	Yes	Yes
424	40425	N12	Yes	Yes
426	40427	N13	Yes	Yes
428	40429	N14	Yes	Yes
430	40431	N15	Yes	Yes
432	40433	N16	Yes	Yes
434	40435	N17	Yes	Yes
436	40437	N18	Yes	Yes
438	40439	N19	Yes	Yes
440	40441	N20	Yes	Yes
442	40443	N21	Yes	Yes
444	40445	N22	Yes	Yes
446	40447	N23	Yes	Yes

448	40449	N24	Yes	Yes
450	40451	N25	Yes	Yes

Speeds

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
602	40603	S0	Yes	Yes
604	40605	S1	Yes	Yes
606	40607	S2	Yes	Yes
608	40609	S3	Yes	Yes
610	40611	S4	Yes	Yes
612	40613	S5	Yes	Yes
614	40615	S6	Yes	Yes
616	40617	S7	Yes	Yes
618	40619	S8	Yes	Yes
620	40621	S9	Yes	Yes
622	40623	S10	Yes	Yes
624	40625	S11	Yes	Yes
626	40627	S12	Yes	Yes
628	40629	S13	Yes	Yes
630	40631	S14	Yes	Yes
632	40633	S15	Yes	Yes

Accelerations

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
634	40635	A0	Yes	Yes
636	40637	A1	Yes	Yes
638	40639	A2	Yes	Yes
640	40641	A3	Yes	Yes
642	40643	A4	Yes	Yes
644	40645	A5	Yes	Yes
646	40647	A6	Yes	Yes
648	40649	A7	Yes	Yes
650	40651	A8	Yes	Yes

Torques

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
652	40653	M0	Yes	Yes
654	40655	M1	Yes	Yes
656	40657	M2	Yes	Yes
658	40659	M3	Yes	Yes
660	40661	M4	Yes	Yes

662	40663	M5	Yes	Yes
664	40665	M6	Yes	Yes
666	40667	M7	Yes	Yes
668	40669	M8	Yes	Yes

K Parameters

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
670	40671	RESERVED	Yes	No
672	40673	K1	Yes	No
674	40675	K2	Yes	No
676	40677	K3	Yes	No
678	40679	K4	Yes	No
680	40681	K5	Yes	No
682	40683	K6	Yes	No
684	40685	K7	Yes	No
686	40687	K8	Yes	No
688	40689	K9	Yes	No
690	40691	K10	Yes	No
692	40693	K11	Yes	No
694	40695	K12	Yes	No
696	40697	K13	Yes	No
698	40699	K14	Yes	No
700	40701	K15	Yes	No
702	40703	K16	Yes	No
704	40705	K17	Yes	No
706	40707	K18	Yes	No
708	40709	K19	Yes	No
710	40711	K20	Yes	Yes
712	40713	K21	Yes	Yes
714	40715	K22	Yes	Yes
716	40717	K23	Yes	Yes
718	40719	K24	Yes	Yes
720	40721	K25	Yes	Yes
722	40723	K26	Yes	Yes
724	40725	K27	Yes	Yes
726	40727	K28	Yes	Yes
728	40729	K29	Yes	Yes
730	40731	K30	Yes	Yes
732	40733	K31	Yes	Yes
734	40735	K32	Yes	Yes
736	40737	K33	Yes	Yes
738	40739	K34	Yes	Yes
740	40741	K35	Yes	Yes
742	40743	K36	Yes	Yes
744	40745	K37	Yes	Yes

746	40747	K38	Yes	Yes
748	40749	K39	Yes	Yes
750	40751	K40	Yes	Yes
752	40753	K41	Yes	Yes
754	40755	K42	Yes	Yes
756	40757	K43	Yes	Yes
758	40759	K44	Yes	Yes
760	40761	K45	Yes	Yes
762	40763	K46	Yes	Yes
764	40765	K47	Yes	Yes
766	40767	K48	Yes	Yes
768	40769	K49	Yes	Yes
770	40771	K50	Yes	Yes
772	40773	K51	Yes	Yes
774	40775	K52	Yes	Yes
776	40777	K53	Yes	Yes
778	40779	K54	Yes	Yes
780	40781	K55	Yes	Yes
782	40783	K56	Yes	Yes
784	40785	K57	Yes	Yes
786	40787	K58	Yes	Yes
788	40789	K59	Yes	Yes
790	40791	K60	Yes	Yes
792	40793	K61	Yes	Yes
794	40795	K62	Yes	Yes
796	40797	K63	Yes	Yes
798	40799	K64	Yes	Yes
800	40801	K65	Yes	Yes
802	40803	K66	Yes	Yes
804	40805	K67	Yes	Yes
806	40807	K68	Yes	Yes
808	40809	K69	Yes	Yes
810	40811	K70	Yes	Yes
812	40813	K71	Yes	Yes
814	40815	K72	Yes	Yes
816	40817	K73	Yes	Yes
818	40819	K74	Yes	Yes
820	40821	K75	Yes	Yes
822	40823	K76	Yes	Yes
824	40825	K77	Yes	Yes
826	40827	K78	Yes	Yes
828	40829	K79	Yes	Yes
830	40831	K80	Yes	Yes
832	40833	K81	Yes	Yes
834	40835	K82	Yes	Yes
836	40837	K83	Yes	Yes
838	40839	K84	Yes	Yes

840	40841	K85	Yes	Yes
842	40843	K86	Yes	Yes
844	40845	K87	Yes	Yes
846	40847	K88	Yes	Yes
848	40849	K89	Yes	Yes
874	40875	RESERVED	No	Yes

H Gain Parameters

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
900	40901	H0	Yes	Yes
902	40903	H1	Yes	Yes
904	40905	H2	Yes	Yes
906	40907	H3	Yes	Yes
908	40909	H4	Yes	Yes
910	40911	H5	Yes	Yes
912	40913	H6	Yes	Yes
914	40915	H7	Yes	Yes

Timers

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
950	40951	T0	Yes	No
952	40953	T1	Yes	Yes
954	40955	T2	Yes	Yes
956	40957	T3	Yes	Yes
958	40959	T4	Yes	Yes
960	40961	T5	Yes	Yes
962	40963	T6	Yes	Yes
964	40965	T7	Yes	Yes
966	40967	T8	Yes	Yes

Direct Control Registers

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
1000	41001	CPUTime	Yes	No
1002	41003	ActualPosition	Yes	No
1004	41005	ActualTargetPosition	Yes	No
1006	41007	MotorStatus	Yes	No
1008	41009	ActualRatedCurrent	Yes	No
1010	41011	ActualOverloadTorque	Yes	No
1012	41013	AnalogIn	Yes	No
1014	41015	DigitalIn	Yes	No

1016	41017	Temperature	Yes	No
1018	41019	DCVoltage	Yes	No
1020	41021	N/A	Yes	No
1022	41023	ModeOfOperationDisplay	Yes	No
1024	41025	N/A	Yes	No
1026	41027	ActualSpeed	Yes	No
1028	41029	TargetPosition	Yes	Yes
1030	41031	TargetSpeed	Yes	Yes
1032	41033	TargetTorque	Yes	Yes
1034	41035	TargetAcceleration	Yes	Yes
1036	41037	TargetDeceleration	Yes	Yes
1038	41039	Controlword	Yes	Yes
1040	41041	ModeOfOperation	Yes	Yes
1042	41043	DigitalOut	Yes	Yes

CM1-T Library Mapped Registers

The set of registers below are typically used when mapping the Modbus read and write messages directly to a data structure.

- This is often achieved using function code 0x23 (read/write in single message)
- The data structure should break the DINT register into the respective variables.
- The CM1-T Library has been developed to be used with IEC 61131-3 IDEs such as Codesys, Machine Expert and TwinCAT. See [Examples and Demos](#).

Holding Register Address		Motor Parameter	Read Access	Write Access
Base Address	Modicon Address			
Read Registers				
1100	41101	us50Counter (DINT)	Yes	No
1102	41103	ActualPosition (DINT)	Yes	No
1104	41105	MotionTarget (DINT)	Yes	No
1106	41107	ActualVelocity (DINT)	Yes	No
1108	41109	MotorStatus (INT) PercentActualCurrent (INT)	Yes	No
1110	41111	PercentOverloadTorque (INT) AnalogIN (INT)	Yes	No
1112	41113	DCVoltage (INT) DigitalIO (SINT) Temperature (SINT)	Yes	No
1114	41115	ModeOfOperationDisplay (SINT) ErrorCode (SINT) ReadAddress1 (INT)	Yes	No
1116	41117	ReadValue1 (DINT)	Yes	No
Write Registers				
1200	41201	TargetPosition (DINT)	Yes	Yes
1202	41203	TargetVelocity (DINT)	Yes	Yes
1204	41205	TargetTorque (INT) TargetAcceleration (INT)	Yes	Yes
1206	41207	TargetDeceleration (INT) ControlWord (INT)	Yes	Yes

1208	41209	ModeOfOperation (SINT) DigitalOUT (SINT) WriteAddress1 (INT)	Yes	Yes
1210	41211	WriteValue1 (DINT)	Yes	Yes
1212	41213	ReadAddress1 (INT) PAD (INT)	Yes	Yes