

Paperless Recorder PR10 / PR20 / PR30

Modbus Communication Manual

1. Input Register Parameter Table for Modbus RTU Slave / TCP Server

1.1 AI / DI / DO / AO Area (Integer Type)

Modbus Address	Notation	Register Name	Access
1	Reserve	Reserve	R
2	AI1	AI 1 process value	R
3	AI2	AI 2 process value	R
4	AI3	AI 3 process value	R
5	AI4	AI 4 process value	R
6	AI5	AI 5 process value	R
7	AI6	AI 6 process value	R
8	AI7	AI 7 process value	R
9	AI8	AI 8 process value	R
10	AI9	AI 9 process value	R
11	AI10	AI 10 process value	R
12	AI11	AI 11 process value	R
13	AI12	AI 12 process value	R
14	AI13	AI 13 process value	R
15	AI14	AI 14 process value	R
16	AI15	AI 15 process value	R
17	AI16	AI 16 process value	R
18	AI17	AI 17 process value	R
19	AI18	AI 18 process value	R
20	AI19	AI 19 process value	R
21	AI20	AI 20 process value	R
22	AI21	AI 21 process value	R
23	AI22	AI 22 process value	R
24	AI23	AI 23 process value	R
25	AI24	AI 24 process value	R
26	AI25	AI 25 process value	R
27	AI26	AI 26 process value	R
28	AI27	AI 27 process value	R
29	AI28	AI 28 process value	R
30	AI29	AI 29 process value	R
31	AI30	AI 30 process value	R

32	AI31	AI 31 process value	R
33	AI32	AI 32 process value	R
34	AI33	AI 33 process value	R
35	AI34	AI 34 process value	R
36	AI35	AI 35 process value	R
37	AI36	AI 36 process value	R
38	AI37	AI 37 process value	R
39	AI38	AI 38 process value	R
40	AI39	AI 39 process value	R
41	AI40	AI 40 process value	R
42	AI41	AI 41 process value	R
43	AI42	AI 42 process value	R
44	AI43	AI 43 process value	R
45	AI44	AI 44 process value	R
46	AI45	AI 45 process value	R
47	AI46	AI 46 process value	R
48	AI47	AI 47 process value	R
49	AI48	AI 48 process value	R
50	DI1	DI 1 process value	R
51	DI2	DI 2 process value	R
52	DI3	DI 3 process value	R
53	DI4	DI 4 process value	R
54	DI5	DI 5 process value	R
55	DI6	DI 6 process value	R
56	DI7	DI 7 process value	R
57	DI8	DI 8 process value	R
58	DI9	DI 9 process value	R
59	DI10	DI 10 process value	R
60	DI11	DI 11 process value	R
61	DI12	DI 12 process value	R
62	DI13	DI 13 process value	R
63	DI14	DI 14 process value	R
64	DI15	DI 15 process value	R
65	DI16	DI 16 process value	R
66	DI17	DI 17 process value	R
67	DI18	DI 18 process value	R

68	DI19	DI 19 process value	R
69	DI20	DI 20 process value	R
70	DI21	DI 21 process value	R
71	DI22	DI 22 process value	R
72	DI23	DI 23 process value	R
73	DI24	DI 24 process value	R
74	DO1	DO 1 process value	R
75	DO2	DO 2 process value	R
76	DO3	DO 3 process value	R
77	DO4	DO 4 process value	R
78	DO5	DO 5 process value	R
79	DO6	DO 6 process value	R
80	DO7	DO 7 process value	R
81	DO8	DO 8 process value	R
82	DO9	DO 9 process value	R
83	DO10	DO 10 process value	R
84	DO11	DO 11 process value	R
85	DO12	DO 12 process value	R
86	DO13	DO 13 process value	R
87	DO14	DO 14 process value	R
88	DO15	DO 15 process value	R
89	DO16	DO 16 process value	R
90	DO17	DO 17 process value	R
91	DO18	DO 18 process value	R
92	DO19	DO 19 process value	R
93	DO20	DO 20 process value	R
94	DO21	DO 21 process value	R
95	DO22	DO 22 process value	R
96	DO23	DO 23 process value	R
97	DO24	DO 24 process value	R
98	AO1	AO 1 process value	R
99	AO2	AO 2 process value	R
100	AO3	AO 3 process value	R
101	AO4	AO 4 process value	R
102	AO5	AO 5 process value	R
103	AO6	AO 6 process value	R

104	AO7	AO 7 process value	R
105	AO8	AO 8 process value	R
106	AO9	AO 9 process value	R
107	AO10	AO 10 process value	R
108	AO11	AO 11 process value	R
109	AO12	AO 12 process value	R

* Note: If the register value is 65534, which value represents communication error.

1.2 AI / DI / DO / AO Area (Float Type)

Modbus Address	Notation	Register Name	Access
1001	Reserve	Reserve	R
1003	AI1	AI 1 process value	R
1005	AI2	AI 2 process value	R
1007	AI3	AI 3 process value	R
1009	AI4	AI 4 process value	R
1011	AI5	AI 5 process value	R
1013	AI6	AI 6 process value	R
1015	AI7	AI 7 process value	R
1017	AI8	AI 8 process value	R
1019	AI9	AI 9 process value	R
1021	AI10	AI 10 process value	R
1023	AI11	AI 11 process value	R
1025	AI12	AI 12 process value	R
1027	AI13	AI 13 process value	R
1029	AI14	AI 14 process value	R
1031	AI15	AI 15 process value	R
1033	AI16	AI 16 process value	R
1035	AI17	AI 17 process value	R
1037	AI18	AI 18 process value	R
1039	AI19	AI 19 process value	R
1041	AI20	AI 20 process value	R
1043	AI21	AI 21 process value	R
1045	AI22	AI 22 process value	R
1047	AI23	AI 23 process value	R
1049	AI24	AI 24 process value	R
1051	AI25	AI 25 process value	R
1053	AI26	AI 26 process value	R
1055	AI27	AI 27 process value	R
1057	AI28	AI 28 process value	R
1059	AI29	AI 29 process value	R
1061	AI30	AI 30 process value	R
1063	AI31	AI 31 process value	R
1065	AI32	AI 32 process value	R
1067	AI33	AI 33 process value	R

1069	AI34	AI 34 process value	R
1071	AI35	AI 35 process value	R
1073	AI36	AI 36 process value	R
1075	AI37	AI 37 process value	R
1077	AI38	AI 38 process value	R
1079	AI39	AI 39 process value	R
1081	AI40	AI 40 process value	R
1083	AI41	AI 41 process value	R
1085	AI42	AI 42 process value	R
1087	AI43	AI 43 process value	R
1089	AI44	AI 44 process value	R
1091	AI45	AI 45 process value	R
1093	AI46	AI 46 process value	R
1095	AI47	AI 47 process value	R
1097	AI48	AI 48 process value	R
1099	DI1	DI 1 process value	R
1101	DI2	DI 2 process value	R
1103	DI3	DI 3 process value	R
1105	DI4	DI 4 process value	R
1107	DI5	DI 5 process value	R
1109	DI6	DI 6 process value	R
1111	DI7	DI 7 process value	R
1113	DI8	DI 8 process value	R
1115	DI9	DI 9 process value	R
1117	DI10	DI 10 process value	R
1119	DI11	DI 11 process value	R
1121	DI12	DI 12 process value	R
1123	DI13	DI 13 process value	R
1125	DI14	DI 14 process value	R
1127	DI15	DI 15 process value	R
1129	DI16	DI 16 process value	R
1131	DI17	DI 17 process value	R
1133	DI18	DI 18 process value	R
1135	DI19	DI 19 process value	R
1137	DI20	DI 20 process value	R
1139	DI21	DI 21 process value	R

1141	DI22	DI 22 process value	R
1143	DI23	DI 23 process value	R
1145	DI24	DI 24 process value	R
1147	DO1	DO 1 process value	R
1149	DO2	DO 2 process value	R
1151	DO3	DO 3 process value	R
1153	DO4	DO 4 process value	R
1155	DO5	DO 5 process value	R
1157	DO6	DO 6 process value	R
1159	DO7	DO 7 process value	R
1161	DO8	DO 8 process value	R
1163	DO9	DO 9 process value	R
1165	DO10	DO 10 process value	R
1167	DO11	DO 11 process value	R
1169	DO12	DO 12 process value	R
1171	DO13	DO 13 process value	R
1173	DO14	DO 14 process value	R
1175	DO15	DO 15 process value	R
1177	DO16	DO 16 process value	R
1179	DO17	DO 17 process value	R
1181	DO18	DO 18 process value	R
1183	DO19	DO 19 process value	R
1185	DO20	DO 20 process value	R
1187	DO21	DO 21 process value	R
1189	DO22	DO 22 process value	R
1191	DO23	DO 23 process value	R
1193	DO24	DO 24 process value	R
1195	AO1	AO 1 process value	R
1197	AO2	AO 2 process value	R
1199	AO3	AO 3 process value	R
1201	AO4	AO 4 process value	R
1203	AO5	AO 5 process value	R
1205	AO6	AO 6 process value	R
1207	AO7	AO 7 process value	R
1209	AO8	AO 8 process value	R
1211	AO9	AO 9 process value	R

1213	AO10	AO 10 process value	R
1215	AO11	AO 11 process value	R
1217	AO12	AO 12 process value	R

* Note: If the register value is 3.0+E38, which value represents communication error.

1.3 Math Area (**Integer Type**)

Modbus Address	Notation	Register Name	Access
201	Math1	Math 1 process value high word	R
202	Math1	Math 1 process value low word	R
203	Math2	Math 2 process value high word	R
204	Math2	Math 2 process value low word	R
205	Math3	Math 3 process value high word	R
206	Math3	Math 3 process value low word	R
207	Math4	Math 4 process value high word	R
208	Math4	Math 4 process value low word	R
209	Math5	Math 5 process value high word	R
210	Math5	Math 5 process value low word	R
211	Math6	Math 6 process value high word	R
212	Math6	Math 6 process value low word	R
213	Math7	Math 7 process value high word	R
214	Math7	Math 7 process value low word	R
215	Math8	Math 8 process value high word	R
216	Math8	Math 8 process value low word	R
217	Math9	Math 9 process value high word	R
218	Math9	Math 9 process value low word	R
219	Math10	Math 10 process value high word	R
220	Math10	Math 10 process value low word	R
221	Math11	Math 11 process value high word	R
222	Math11	Math 11 process value low word	R
223	Math12	Math 12 process value high word	R
224	Math12	Math 12 process value low word	R
225	Math13	Math 13 process value high word	R
226	Math13	Math 13 process value low word	R
227	Math14	Math 14 process value high word	R
228	Math14	Math 14 process value low word	R
229	Math15	Math 15 process value high word	R
230	Math15	Math 15 process value low word	R
231	Math16	Math 16 process value high word	R
232	Math16	Math 16 process value low word	R
233	Math17	Math 17 process value high word	R
234	Math17	Math 17 process value low word	R

235	Math18	Math 18 process value high word	R
236	Math18	Math 18 process value low word	R
237	Math19	Math 19 process value high word	R
238	Math19	Math 19 process value low word	R
239	Math20	Math 20 process value high word	R
240	Math20	Math 20 process value low word	R
241	Math21	Math 21 process value high word	R
242	Math21	Math 21 process value low word	R
243	Math22	Math 22 process value high word	R
244	Math22	Math 22 process value low word	R
245	Math23	Math 23 process value high word	R
246	Math23	Math 23 process value low word	R
247	Math24	Math 24 process value high word	R
248	Math24	Math 24 process value low word	R
249	Math25	Math 25 process value high word	R
250	Math25	Math 25 process value low word	R
251	Math26	Math 26 process value high word	R
252	Math26	Math 26 process value low word	R
253	Math27	Math 27 process value high word	R
254	Math27	Math 27 process value low word	R
255	Math28	Math 28 process value high word	R
256	Math28	Math 28 process value low word	R
257	Math29	Math 29 process value high word	R
258	Math29	Math 29 process value low word	R
259	Math30	Math 30 process value high word	R
260	Math30	Math 30 process value low word	R
261	Math31	Math 31 process value high word	R
262	Math31	Math 31 process value low word	R
263	Math32	Math 32 process value high word	R
264	Math32	Math 32 process value low word	R
265	Math33	Math 33 process value high word	R
266	Math33	Math 33 process value low word	R
267	Math34	Math 34 process value high word	R
268	Math34	Math 34 process value low word	R
269	Math35	Math 35 process value high word	R
270	Math35	Math 35 process value low word	R

271	Math36	Math 36 process value high word	R
272	Math36	Math 36 process value low word	R
273	Math37	Math 37 process value high word	R
274	Math37	Math 37 process value low word	R
275	Math38	Math 38 process value high word	R
276	Math38	Math 38 process value low word	R
277	Math39	Math 39 process value high word	R
278	Math39	Math 39 process value low word	R
279	Math40	Math 40 process value high word	R
280	Math40	Math 40 process value low word	R
281	Math41	Math 41 process value high word	R
282	Math41	Math 41 process value low word	R
283	Math42	Math 42 process value high word	R
284	Math42	Math 42 process value low word	R
285	Math43	Math 43 process value high word	R
286	Math43	Math 43 process value low word	R
287	Math44	Math 44 process value high word	R
288	Math44	Math 44 process value low word	R
289	Math45	Math 45 process value high word	R
290	Math45	Math 45 process value low word	R
291	Math46	Math 46 process value high word	R
292	Math46	Math 46 process value low word	R
293	Math47	Math 47 process value high word	R
294	Math47	Math 47 process value low word	R
295	Math48	Math 48 process value high word	R
296	Math48	Math 48 process value low word	R
297	Math49	Math 49 process value high word	R
298	Math49	Math 49 process value low word	R
299	Math50	Math 50 process value high word	R
300	Math50	Math 50 process value low word	R
301	Math51	Math 51 process value high word	R
302	Math51	Math 51 process value low word	R
303	Math52	Math 52 process value high word	R
304	Math52	Math 52 process value low word	R
305	Math53	Math 53 process value high word	R
306	Math53	Math 53 process value low word	R

307	Math54	Math 54 process value high word	R
308	Math54	Math 54 process value low word	R
309	Math55	Math 55 process value high word	R
310	Math55	Math 55 process value low word	R
311	Math56	Math 56 process value high word	R
312	Math56	Math 56 process value low word	R
313	Math57	Math 57 process value high word	R
314	Math57	Math 57 process value low word	R
315	Math58	Math 58 process value high word	R
316	Math58	Math 58 process value low word	R
317	Math59	Math 59 process value high word	R
318	Math59	Math 59 process value low word	R
319	Math60	Math 60 process value high word	R
320	Math60	Math 60 process value low word	R

* Note: If the register value is 4294967294, which value represents communication error.

1.4 Math Area (**Float Type**)

Modbus Address	Notation	Register Name	Access
1401	Math1	Math 1 process value	R
1403	Math2	Math 2 process value	R
1405	Math3	Math 3 process value	R
1407	Math4	Math 4 process value	R
1409	Math5	Math 5 process value	R
1411	Math6	Math 6 process value	R
1413	Math7	Math 7 process value	R
1415	Math8	Math 8 process value	R
1417	Math9	Math 9 process value	R
1419	Math10	Math 10 process value	R
1421	Math11	Math 11 process value	R
1423	Math12	Math 12 process value	R
1425	Math13	Math 13 process value	R
1427	Math14	Math 14 process value	R
1429	Math15	Math 15 process value	R
1431	Math16	Math 16 process value	R
1433	Math17	Math 17 process value	R
1435	Math18	Math 18 process value	R
1437	Math19	Math 19 process value	R
1439	Math20	Math 20 process value	R
1441	Math21	Math 21 process value	R
1443	Math22	Math 22 process value	R
1445	Math23	Math 23 process value	R
1447	Math24	Math 24 process value	R
1449	Math25	Math 25 process value	R
1451	Math26	Math 26 process value	R
1453	Math27	Math 27 process value	R
1455	Math28	Math 28 process value	R
1457	Math29	Math 29 process value	R
1459	Math30	Math 30 process value	R
1461	Math31	Math 31 process value	R
1463	Math32	Math 32 process value	R
1465	Math33	Math 33 process value	R
1467	Math34	Math 34 process value	R

1469	Math35	Math 35 process value	R
1471	Math36	Math 36 process value	R
1473	Math37	Math 37 process value	R
1475	Math38	Math 38 process value	R
1477	Math39	Math 39 process value	R
1479	Math40	Math 40 process value	R
1481	Math41	Math 41 process value	R
1483	Math42	Math 42 process value	R
1485	Math43	Math 43 process value	R
1487	Math44	Math 44 process value	R
1489	Math45	Math 45 process value	R
1491	Math46	Math 46 process value	R
1493	Math47	Math 47 process value	R
1495	Math48	Math 48 process value	R
1497	Math49	Math 49 process value	R
1499	Math50	Math 50 process value	R
1501	Math51	Math 51 process value	R
1503	Math52	Math 52 process value	R
1505	Math53	Math 53 process value	R
1507	Math54	Math 54 process value	R
1509	Math55	Math 55 process value	R
1511	Math56	Math 56 process value	R
1513	Math57	Math 57 process value	R
1515	Math58	Math 58 process value	R
1517	Math59	Math 59 process value	R
1519	Math60	Math 60 process value	R

* Note: If the register value is 3.0+E38, which value represents communication error.

2. Holding Register Parameter Table for Modbus RTU Slave / TCP Server

2.1 2 Bytes Type Area (**Integer Type**)

Modbus Address	Notation	Register Name	Access
1	Ext1	Measured data on External 1	R/W
2	Ext2	Measured data on External 2	R/W
3	Ext3	Measured data on External 3	R/W
4	Ext4	Measured data on External 4	R/W
5	Ext5	Measured data on External 5	R/W
6	Ext6	Measured data on External 6	R/W
7	Ext7	Measured data on External 7	R/W
8	Ext8	Measured data on External 8	R/W
9	Ext9	Measured data on External 9	R/W
10	Ext10	Measured data on External 10	R/W
11	Ext11	Measured data on External 11	R/W
12	Ext12	Measured data on External 12	R/W
13	Ext13	Measured data on External 13	R/W
14	Ext14	Measured data on External 14	R/W
15	Ext15	Measured data on External 15	R/W
16	Ext16	Measured data on External 16	R/W
17	Ext17	Measured data on External 17	R/W
18	Ext18	Measured data on External 18	R/W
19	Ext19	Measured data on External 19	R/W
20	Ext20	Measured data on External 20	R/W
21	Ext21	Measured data on External 21	R/W
22	Ext22	Measured data on External 22	R/W
23	Ext23	Measured data on External 23	R/W
24	Ext24	Measured data on External 24	R/W
25	Ext25	Measured data on External 25	R/W
26	Ext26	Measured data on External 26	R/W
27	Ext27	Measured data on External 27	R/W
28	Ext28	Measured data on External 28	R/W
29	Ext29	Measured data on External 29	R/W
30	Ext30	Measured data on External 30	R/W
31	Ext31	Measured data on External 31	R/W

32	Ext32	Measured data on External 32	R/W
33	Ext33	Measured data on External 33	R/W
34	Ext34	Measured data on External 34	R/W
35	Ext35	Measured data on External 35	R/W
36	Ext36	Measured data on External 36	R/W
37	Ext37	Measured data on External 37	R/W
38	Ext38	Measured data on External 38	R/W
39	Ext39	Measured data on External 39	R/W
40	Ext40	Measured data on External 40	R/W
41	Ext41	Measured data on External 41	R/W
42	Ext42	Measured data on External 42	R/W
43	Ext43	Measured data on External 43	R/W
44	Ext44	Measured data on External 44	R/W
45	Ext45	Measured data on External 45	R/W
46	Ext46	Measured data on External 46	R/W
47	Ext47	Measured data on External 47	R/W
48	Ext48	Measured data on External 48	R/W
49	Ext49	Measured data on External 49	R/W
50	Ext50	Measured data on External 50	R/W
51	Ext51	Measured data on External 51	R/W
52	Ext52	Measured data on External 52	R/W
53	Ext53	Measured data on External 53	R/W
54	Ext54	Measured data on External 54	R/W
55	Ext55	Measured data on External 55	R/W
56	Ext56	Measured data on External 56	R/W
57	Ext57	Measured data on External 57	R/W
58	Ext58	Measured data on External 58	R/W
59	Ext59	Measured data on External 59	R/W
60	Ext60	Measured data on External 60	R/W
61	Ext61	Measured data on External 61	R/W
62	Ext62	Measured data on External 62	R/W
63	Ext63	Measured data on External 63	R/W
64	Ext64	Measured data on External 64	R/W
65	Ext65	Measured data on External 65	R/W
66	Ext66	Measured data on External 66	R/W
67	Ext67	Measured data on External 67	R/W

68	Ext68	Measured data on External 68	R/W
69	Ext69	Measured data on External 69	R/W
70	Ext70	Measured data on External 70	R/W
71	Ext71	Measured data on External 71	R/W
72	Ext72	Measured data on External 72	R/W
73	Ext73	Measured data on External 73	R/W
74	Ext74	Measured data on External 74	R/W
75	Ext75	Measured data on External 75	R/W
76	Ext76	Measured data on External 76	R/W
77	Ext77	Measured data on External 77	R/W
78	Ext78	Measured data on External 78	R/W
79	Ext79	Measured data on External 79	R/W
80	Ext80	Measured data on External 80	R/W
81	Ext81	Measured data on External 81	R/W
82	Ext82	Measured data on External 82	R/W
83	Ext83	Measured data on External 83	R/W
84	Ext84	Measured data on External 84	R/W
85	Ext85	Measured data on External 85	R/W
86	Ext86	Measured data on External 86	R/W
87	Ext87	Measured data on External 87	R/W
88	Ext88	Measured data on External 88	R/W
89	Ext89	Measured data on External 89	R/W
90	Ext90	Measured data on External 90	R/W
91	Ext91	Measured data on External 91	R/W
92	Ext92	Measured data on External 92	R/W
93	Ext93	Measured data on External 93	R/W
94	Ext94	Measured data on External 94	R/W
95	Ext95	Measured data on External 95	R/W
96	Ext96	Measured data on External 96	R/W

* Note: If the register value is 65534, which value represents communication error.

2.2 4 Bytes Type Area (**Integer Type**)

Modbus Address	Notation	Register Name	Access
201	Ext1	The high word of measured data is on External 1	R/W
202	Ext1	The low word of measured data is on External 1	R/W
203	Ext2	The high word of measured data is on External 2	R/W
204	Ext2	The low word of measured data is on External 2	R/W
205	Ext3	The high word of measured data is on External 3	R/W
206	Ext3	The low word of measured data is on External 3	R/W
207	Ext4	The high word of measured data is on External 4	R/W
208	Ext4	The low word of measured data is on External 4	R/W
209	Ext5	The high word of measured data is on External 5	R/W
210	Ext5	The low word of measured data is on External 5	R/W
211	Ext6	The high word of measured data is on External 6	R/W
212	Ext6	The low word of measured data is on External 6	R/W
213	Ext7	The high word of measured data is on External 7	R/W
214	Ext7	The low word of measured data is on External 7	R/W
215	Ext8	The high word of measured data is on External 8	R/W
216	Ext8	The low word of measured data is on External 8	R/W
217	Ext9	The high word of measured data is on External 9	R/W
218	Ext9	The low word of measured data is on External 9	R/W

		External 9	
219	Ext10	The high word of measured data is on External 10	R/W
220	Ext10	The low word of measured data is on External 10	R/W
221	Ext11	The high word of measured data is on External 11	R/W
222	Ext11	The low word of measured data is on External 11	R/W
223	Ext12	The high word of measured data is on External 12	R/W
224	Ext12	The low word of measured data is on External 12	R/W
225	Ext13	The high word of measured data is on External 13	R/W
226	Ext13	The low word of measured data is on External 13	R/W
227	Ext14	The high word of measured data is on External 14	R/W
228	Ext14	The low word of measured data is on External 14	R/W
229	Ext15	The high word of measured data is on External 15	R/W
230	Ext15	The low word of measured data is on External 15	R/W
231	Ext16	The high word of measured data is on External 16	R/W
232	Ext16	The low word of measured data is on External 16	R/W
233	Ext17	The high word of measured data is on External 17	R/W
234	Ext17	The low word of measured data is on External 17	R/W
235	Ext18	The high word of measured data is on External 18	R/W
236	Ext18	The low word of measured data is on External 18	R/W

237	Ext19	The high word of measured data is on External 19	R/W
238	Ext19	The low word of measured data is on External 19	R/W
239	Ext20	The high word of measured data is on External 20	R/W
240	Ext20	The low word of measured data is on External 20	R/W
241	Ext21	The high word of measured data is on External 21	R/W
242	Ext21	The low word of measured data is on External 21	R/W
243	Ext22	The high word of measured data is on External 22	R/W
244	Ext22	The low word of measured data is on External 22	R/W
245	Ext23	The high word of measured data is on External 23	R/W
246	Ext23	The low word of measured data is on External 23	R/W
247	Ext24	The high word of measured data is on External 24	R/W
248	Ext24	The low word of measured data is on External 24	R/W
249	Ext25	The high word of measured data is on External 25	R/W
250	Ext25	The low word of measured data is on External 25	R/W
251	Ext26	The high word of measured data is on External 26	R/W
252	Ext26	The low word of measured data is on External 26	R/W
253	Ext27	The high word of measured data is on External 27	R/W
254	Ext27	The low word of measured data is on External 27	R/W
255	Ext28	The high word of measured data is on	R/W

		External 28	
256	Ext28	The low word of measured data is on External 28	R/W
257	Ext29	The high word of measured data is on External 29	R/W
258	Ext29	The low word of measured data is on External 29	R/W
259	Ext30	The high word of measured data is on External 30	R/W
260	Ext30	The low word of measured data is on External 30	R/W
261	Ext31	The high word of measured data is on External 31	R/W
262	Ext31	The low word of measured data is on External 31	R/W
263	Ext32	The high word of measured data is on External 32	R/W
264	Ext32	The low word of measured data is on External 32	R/W
265	Ext33	The high word of measured data is on External 33	R/W
266	Ext33	The low word of measured data is on External 33	R/W
267	Ext34	The high word of measured data is on External 34	R/W
268	Ext34	The low word of measured data is on External 34	R/W
269	Ext35	The high word of measured data is on External 35	R/W
270	Ext35	The high word of measured data is on External 35	R/W
271	Ext36	The high word of measured data is on External 36	R/W
272	Ext36	The low word of measured data is on External 36	R/W
273	Ext37	The high word of measured data is on External 37	R/W

274	Ext37	The low word of measured data is on External 37	R/W
275	Ext38	The high word of measured data is on External 38	R/W
276	Ext38	The low word of measured data is on External 38	R/W
277	Ext39	The high word of measured data is on External 39	R/W
278	Ext39	The low word of measured data is on External 39	R/W
279	Ext40	The high word of measured data is on External 40	R/W
280	Ext40	The low word of measured data is on External 40	R/W
281	Ext41	The high word of measured data is on External 41	R/W
282	Ext41	The low word of measured data is on External 41	R/W
283	Ext42	The high word of measured data is on External 42	R/W
284	Ext42	The low word of measured data is on External 42	R/W
285	Ext43	The high word of measured data is on External 43	R/W
286	Ext43	The low word of measured data is on External 43	R/W
287	Ext44	The high word of measured data is on External 44	R/W
288	Ext44	The low word of measured data is on External 44	R/W
289	Ext45	The high word of measured data is on External 45	R/W
290	Ext45	The low word of measured data is on External 45	R/W
291	Ext46	The high word of measured data is on External 46	R/W
292	Ext46	The low word of measured data is on	R/W

		External 46	
293	Ext47	The high word of measured data is on External 47	R/W
294	Ext47	The low word of measured data is on External 47	R/W
295	Ext48	The high word of measured data is on External 48	R/W
296	Ext48	The low word of measured data is on External 48	R/W
297	Ext49	The high word of measured data is on External 49	R/W
298	Ext49	The low word of measured data is on External 49	R/W
299	Ext50	The high word of measured data is on External 50	R/W
300	Ext50	The low word of measured data is on External 50	R/W
301	Ext51	The high word of measured data is on External 51	R/W
302	Ext51	The low word of measured data is on External 51	R/W
303	Ext52	The high word of measured data is on External 52	R/W
304	Ext52	The low word of measured data is on External 52	R/W
305	Ext53	The high word of measured data is on External 53	R/W
306	Ext53	The low word of measured data is on External 53	R/W
307	Ext54	The high word of measured data is on External 54	R/W
308	Ext54	The low word of measured data is on External 54	R/W
309	Ext55	The high word of measured data is on External 55	R/W
310	Ext55	The low word of measured data is on External 55	R/W

311	Ext56	The high word of measured data is on External 56	R/W
312	Ext56	The low word of measured data is on External 56	R/W
313	Ext57	The high word of measured data is on External 57	R/W
314	Ext57	The low word of measured data is on External 57	R/W
315	Ext58	The high word of measured data is on External 58	R/W
316	Ext58	The low word of measured data is on External 58	R/W
317	Ext59	The high word of measured data is on External 59	R/W
318	Ext59	The low word of measured data is on External 59	R/W
319	Ext60	The high word of measured data is on External 60	R/W
320	Ext60	The low word of measured data is on External 60	R/W
321	Ext61	The high word of measured data is on External 61	R/W
322	Ext61	The low word of measured data is on External 61	R/W
323	Ext62	The high word of measured data is on External 62	R/W
324	Ext62	The low word of measured data is on External 62	R/W
325	Ext63	The high word of measured data is on External 63	R/W
326	Ext63	The low word of measured data is on External 63	R/W
327	Ext64	The high word of measured data is on External 64	R/W
328	Ext64	The low word of measured data is on External 64	R/W
329	Ext65	The high word of measured data is on	R/W

		External 65	
330	Ext65	The low word of measured data is on External 65	R/W
331	Ext66	The high word of measured data is on External 66	R/W
332	Ext66	The low word of measured data is on External 66	R/W
333	Ext67	The high word of measured data is on External 67	R/W
334	Ext67	The low word of measured data is on External 67	R/W
335	Ext68	The high word of measured data is on External 68	R/W
336	Ext68	The low word of measured data is on External 68	R/W
337	Ext69	The high word of measured data is on External 69	R/W
338	Ext69	The low word of measured data is on External 69	R/W
339	Ext70	The high word of measured data is on External 70	R/W
340	Ext70	The low word of measured data is on External 70	R/W
341	Ext71	The high word of measured data is on External 71	R/W
342	Ext71	The low word of measured data is on External 71	R/W
343	Ext72	The high word of measured data is on External 72	R/W
344	Ext72	The low word of measured data is on External 72	R/W
345	Ext73	The high word of measured data is on External 73	R/W
346	Ext73	The low word of measured data is on External 73	R/W
347	Ext74	The high word of measured data is on External 74	R/W

348	Ext74	The low word of measured data is on External 74	R/W
349	Ext75	The high word of measured data is on External 75	R/W
350	Ext75	The low word of measured data is on External 75	R/W
351	Ext76	The high word of measured data is on External 76	R/W
352	Ext76	The low word of measured data is on External 76	R/W
353	Ext77	The high word of measured data is on External 77	R/W
354	Ext77	The low word of measured data is on External 77	R/W
355	Ext78	The high word of measured data is on External 78	R/W
356	Ext78	The low word of measured data is on External 78	R/W
357	Ext79	The high word of measured data is on External 79	R/W
358	Ext79	The low word of measured data is on External 79	R/W
359	Ext80	The high word of measured data is on External 80	R/W
360	Ext80	The low word of measured data is on External 80	R/W
361	Ext81	The high word of measured data is on External 81	R/W
362	Ext81	The low word of measured data is on External 81	R/W
363	Ext82	The high word of measured data is on External 82	R/W
364	Ext82	The low word of measured data is on External 82	R/W
365	Ext83	The high word of measured data is on External 83	R/W
366	Ext83	The low word of measured data is on	R/W

		External 83	
367	Ext84	The high word of measured data is on External 84	R/W
368	Ext84	The low word of measured data is on External 84	R/W
369	Ext85	The high word of measured data is on External 85	R/W
370	Ext85	The low word of measured data is on External 85	R/W
371	Ext86	The high word of measured data is on External 86	R/W
372	Ext86	The low word of measured data is on External 86	R/W
373	Ext87	The high word of measured data is on External 87	R/W
374	Ext87	The low word of measured data is on External 87	R/W
375	Ext88	The high word of measured data is on External 88	R/W
376	Ext88	The low word of measured data is on External 88	R/W
377	Ext89	The high word of measured data is on External 89	R/W
378	Ext89	The low word of measured data is on External 89	R/W
379	Ext90	The high word of measured data is on External 90	R/W
380	Ext90	The low word of measured data is on External 90	R/W
381	Ext91	The high word of measured data is on External 91	R/W
382	Ext91	The low word of measured data is on External 91	R/W
383	Ext92	The high word of measured data is on External 92	R/W
384	Ext92	The low word of measured data is on External 92	R/W

385	Ext93	The high word of measured data is on External 93	R/W
386	Ext93	The low word of measured data is on External 93	R/W
387	Ext94	The high word of measured data is on External 94	R/W
388	Ext94	The low word of measured data is on External 94	R/W
389	Ext95	The high word of measured data is on External 95	R/W
390	Ext95	The low word of measured data is on External 95	R/W
391	Ext96	The high word of measured data is on External 96	R/W
392	Ext96	The low word of measured data is on External 96	R/W

* Note: If the register value is 4294967294, which value represents communication error.

2.3 4 Bytes Type Area (**Float Type**)

Modbus Address	Notation	Register Name	Access
1001	Ext1	Measured data on External 1	R/W
1003	Ext2	Measured data on External 2	R/W
1005	Ext3	Measured data on External 3	R/W
1007	Ext4	Measured data on External 4	R/W
1009	Ext5	Measured data on External 5	R/W
1011	Ext6	Measured data on External 6	R/W
1013	Ext7	Measured data on External 7	R/W
1015	Ext8	Measured data on External 8	R/W
1017	Ext9	Measured data on External 9	R/W
1019	Ext10	Measured data on External 10	R/W
1021	Ext11	Measured data on External 11	R/W
1023	Ext12	Measured data on External 12	R/W
1025	Ext13	Measured data on External 13	R/W
1027	Ext14	Measured data on External 14	R/W
1029	Ext15	Measured data on External 15	R/W
1031	Ext16	Measured data on External 16	R/W
1033	Ext17	Measured data on External 17	R/W
1035	Ext18	Measured data on External 18	R/W
1037	Ext19	Measured data on External 19	R/W
1039	Ext20	Measured data on External 20	R/W
1041	Ext21	Measured data on External 21	R/W
1043	Ext22	Measured data on External 22	R/W
1045	Ext23	Measured data on External 23	R/W
1047	Ext24	Measured data on External 24	R/W
1049	Ext25	Measured data on External 25	R/W
1051	Ext26	Measured data on External 26	R/W
1053	Ext27	Measured data on External 27	R/W
1055	Ext28	Measured data on External 28	R/W
1057	Ext29	Measured data on External 29	R/W
1059	Ext30	Measured data on External 30	R/W
1061	Ext31	Measured data on External 31	R/W
1063	Ext32	Measured data on External 32	R/W
1065	Ext33	Measured data on External 33	R/W
1067	Ext34	Measured data on External 34	R/W

1069	Ext35	Measured data on External 35	R/W
1071	Ext36	Measured data on External 36	R/W
1073	Ext37	Measured data on External 37	R/W
1075	Ext38	Measured data on External 38	R/W
1077	Ext39	Measured data on External 39	R/W
1079	Ext40	Measured data on External 40	R/W
1081	Ext41	Measured data on External 41	R/W
1083	Ext42	Measured data on External 42	R/W
1085	Ext43	Measured data on External 43	R/W
1087	Ext44	Measured data on External 44	R/W
1089	Ext45	Measured data on External 45	R/W
1091	Ext46	Measured data on External 46	R/W
1093	Ext47	Measured data on External 47	R/W
1095	Ext48	Measured data on External 48	R/W
1097	Ext49	Measured data on External 49	R/W
1099	Ext50	Measured data on External 50	R/W
1101	Ext51	Measured data on External 51	R/W
1103	Ext52	Measured data on External 52	R/W
1105	Ext53	Measured data on External 53	R/W
1107	Ext54	Measured data on External 54	R/W
1109	Ext55	Measured data on External 55	R/W
1111	Ext56	Measured data on External 56	R/W
1113	Ext57	Measured data on External 57	R/W
1115	Ext58	Measured data on External 58	R/W
1117	Ext59	Measured data on External 59	R/W
1119	Ext60	Measured data on External 60	R/W
1121	Ext61	Measured data on External 61	R/W
1123	Ext62	Measured data on External 62	R/W
1125	Ext63	Measured data on External 63	R/W
1127	Ext64	Measured data on External 64	R/W
1129	Ext65	Measured data on External 65	R/W
1131	Ext66	Measured data on External 66	R/W
1133	Ext67	Measured data on External 67	R/W
1135	Ext68	Measured data on External 68	R/W
1137	Ext69	Measured data on External 69	R/W
1139	Ext70	Measured data on External 70	R/W

1141	Ext71	Measured data on External 71	R/W
1143	Ext72	Measured data on External 72	R/W
1145	Ext73	Measured data on External 73	R/W
1147	Ext74	Measured data on External 74	R/W
1149	Ext75	Measured data on External 75	R/W
1151	Ext76	Measured data on External 76	R/W
1153	Ext77	Measured data on External 77	R/W
1155	Ext78	Measured data on External 78	R/W
1157	Ext79	Measured data on External 79	R/W
1159	Ext80	Measured data on External 80	R/W
1161	Ext81	Measured data on External 81	R/W
1163	Ext82	Measured data on External 82	R/W
1165	Ext83	Measured data on External 83	R/W
1167	Ext84	Measured data on External 84	R/W
1169	Ext85	Measured data on External 85	R/W
1171	Ext86	Measured data on External 86	R/W
1173	Ext87	Measured data on External 87	R/W
1175	Ext88	Measured data on External 88	R/W
1177	Ext89	Measured data on External 89	R/W
1179	Ext90	Measured data on External 90	R/W
1181	Ext91	Measured data on External 91	R/W
1183	Ext92	Measured data on External 92	R/W
1185	Ext93	Measured data on External 93	R/W
1187	Ext94	Measured data on External 94	R/W
1189	Ext95	Measured data on External 95	R/W
1191	Ext96	Measured data on External 96	R/W

* Note: If the register value is 3.0+E38, which value represents communication error.

3. Holding Register Parameter Table for Remote Command

3.1 Command Area

Modbus Address	Register Name	Note	Access
10002	Start / Stop data log	0 : Stop 1 : Start	R/W
10102	Batch Name	Include 2 characters for each register①	R/W
10103	Batch Name	①	R/W
10104	Batch Name	①	R/W
10105	Batch Name	①	R/W
10106	Batch Name	①	R/W
10107	Batch Name	①	R/W
10108	Batch Name	①	R/W
10109	Batch Name	①	R/W
10110	Batch Name	①	R/W
10111	Batch Name	①	R/W
10112	Batch Name	①	R/W
10113	Batch Name	①	R/W
10114	Batch Name	①	R/W
10115	Batch Name	①	R/W
10116	Batch Name	①	R/W
10117	Batch Name	①	R/W
10118	Batch Name	①	R/W
10119	Batch Name	①	R/W
10120	Lot NO.	1 ~ 65535	R/W
10121	Comment1	Include 2 characters for each register①	R/W
10122	Comment1	①	R/W
10123	Comment1	①	R/W
10124	Comment1	①	R/W
10125	Comment1	①	R/W
10126	Comment1	①	R/W
10127	Comment1	①	R/W

10128	Comment1	①	R/W
10129	Comment1	①	R/W
10130	Comment1	①	R/W
10131	Comment1	①	R/W
10132	Comment1	①	R/W
10133	Comment1	①	R/W
10134	Comment1	①	R/W
10135	Comment1	①	R/W
10136	Comment1	①	R/W
10137	Comment1	①	R/W
10138	Comment1	①	R/W
10139	Comment1	①	R/W
10140	Comment1	①	R/W
10141	Comment1	①	R/W
10142	Comment1	①	R/W
10143	Comment1	①	R/W
10144	Comment1	①	R/W
10145	Comment1	①	R/W
10146	Comment1	①	R/W
10147	Comment1	①	R/W
10148	Comment1	①	R/W
10149	Comment1	①	R/W
10150	Comment1	①	R/W
10151	Comment1	①	R/W
10152	Comment1	①	R/W
10153	Comment1	①	R/W
10154	Comment1	①	R/W
10155	Comment1	①	R/W
10156	Comment1	①	R/W
10157	Comment2	①	R/W
10158	Comment2	①	R/W
10159	Comment2	①	R/W
10160	Comment2	①	R/W
10161	Comment2	①	R/W
10162	Comment2	①	R/W
10163	Comment2	①	R/W

10164	Comment2	①	R/W
10165	Comment2	①	R/W
10166	Comment2	①	R/W
10167	Comment2	①	R/W
10168	Comment2	①	R/W
10169	Comment2	①	R/W
10170	Comment2	①	R/W
10171	Comment2	①	R/W
10172	Comment2	①	R/W
10173	Comment2	①	R/W
10174	Comment2	①	R/W
10175	Comment2	①	R/W
10176	Comment2	①	R/W
10177	Comment2	①	R/W
10178	Comment2	①	R/W
10179	Comment2	①	R/W
10180	Comment2	①	R/W
10181	Comment2	①	R/W
10182	Comment2	①	R/W
10183	Comment2	①	R/W
10184	Comment2	①	R/W
10185	Comment2	①	R/W
10186	Comment2	①	R/W
10187	Comment2	①	R/W
10188	Comment2	①	R/W
10189	Comment2	①	R/W
10190	Comment2	①	R/W
10191	Comment2	①	R/W
10192	Comment2	①	R/W
10193	Comment3	①	R/W
10194	Comment3	①	R/W
10195	Comment3	①	R/W
10196	Comment3	①	R/W
10197	Comment3	①	R/W
10198	Comment3	①	R/W
10199	Comment3	①	R/W

10200	Comment3	①	R/W
10201	Comment3	①	R/W
10202	Comment3	①	R/W
10203	Comment3	①	R/W
10204	Comment3	①	R/W
10205	Comment3	①	R/W
10206	Comment3	①	R/W
10207	Comment3	①	R/W
10208	Comment3	①	R/W
10209	Comment3	①	R/W
10210	Comment3	①	R/W
10211	Comment3	①	R/W
10212	Comment3	①	R/W
10213	Comment3	①	R/W
10214	Comment3	①	R/W
10215	Comment3	①	R/W
10216	Comment3	①	R/W
10217	Comment3	①	R/W
10218	Comment3	①	R/W
10219	Comment3	①	R/W
10220	Comment3	①	R/W
10221	Comment3	①	R/W
10222	Comment3	①	R/W
10223	Comment3	①	R/W
10224	Comment3	①	R/W
10225	Comment3	①	R/W
10226	Comment3	①	R/W
10227	Comment3	①	R/W
10228	Comment3	①	R/W

Note:

① Don't input invalid character, such as : 0x00, 0x01 etc..

4. Modbus Communication

4.1 Read Input Registers (Function 0x04)

The function code is used to read from 1 to 120 contiguous input registers in remote device.

Query

The query message specifies the starting register and quantity of registers to be read. Registers are addressed starting at zero: register 1 – 16 are addressed as 0 – 15.

Here is an example of a request to read register 0 (register type is Input Register, address is 1) from slave device 1:

Field Name	RTU example (Hex)
Slave Address	01
Function	04
Starting Address Hi	00
Starting Address Lo	00
Quantity of Registers Hi	00
Quantity of Registers Lo	01
Error Check Lo	31
Error Check Hi	CA
Total Bytes	8

Response

The register data in the response message are packed as two bytes per registers, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits and the second contains the low order bits.

The response is return when the data is completely assembled. Here is an example of a response to the query on the opposite page:

Field Name	RTU example (Hex)
Slave Address	01
Function	04
Byte Count	02
Data Hi	00
Data Lo	0A
Error Check Lo	39
Error Check Hi	37

Total Bytes	7
-------------	---

4.2 Preset (Write) Multiple Registers (Function 0x10)

The function code is used to write a block of contiguous registers (1 to 120 registers) in remote device.

Query

The query message specified the register references to be preset. Registers are addressed starting at zero: register 1 is addressed as 0. The requested preset values are specified in the query data field. Data is packed as two bytes per register.

Here is an example of a request to preset two registers starting at 40001 to 00 0A and 01 02 hex in slave device 1:

Field Name	RTU example (Hex)
Slave Address	01
Function	10
Starting Address Hi	00
Starting Address Lo	00
Quantity of Registers Hi	00
Quantity of Registers Lo	02
Byte Count	04
Data Hi	00
Data Lo	0A
Data Hi	01
Data Lo	02
Error Check Lo	53
Error Check Hi	FC
Total Bytes	13

Response

The normal response returns the slave address, function code, starting address and quantity of registers preset. Here is an example of a response to the query shown above:

Field Name	RTU example (Hex)
Slave Address	01
Function	10
Starting Address Hi	00
Starting Address Lo	00

Quantity of Registers Hi	00
Quantity of Registers Lo	02
Error Check Lo	41
Error Check Hi	C8
Total Bytes	13

4.3 Placing the CRC into message

When the 16 bit CRC (two 8 bit bytes) is transmitted in the message, the low order byte will be transmitted first, followed by the high order byte.

For example, if the CRC value is 1241 hex:

Slave Address	Function	Data	CRC Lo	CRC Hi
--	--	--	41	12

* Note: Broadcast is not supported.

5. Sample Code

5.1 CRC Generation Function

An example of a C language function performing CRC generation is shown on the following pages. All of the possible CRC values are preloaded into two arrays, which are simply indexed as the function increments through the message buffer. One array contains all of the 256 possible CRC values for the high byte of the 16 bit CRC field, and the other array contains all of the values for the low byte. Indexing the CRC in this way provides faster execution than would be achieved by calculating a new CRC value with each new character from the message buffer.

```

/*****
//   Parameter:
//   puchMsg -> unsigned char* puchMsg: message to calculate CRC upon
//   usDataLen -> unsigned short usDataLen: quantity of bytes in message
*****/
unsigned short CRC16(puchMsg, usDataLen)
{
    unsigned char uchCRCHi=0xFF; /* high byte of CRC initialized */
    unsigned char uchCRCLo=0xFF; /* low byte of CRC initialized */
    unsigned uIndex; /* will index into CRC lookup table */
    while (usDataLen-- > 0) /* pass through message buffer */
    {
        uIndex = uchCRCHi ^ *puchMsg++; /* calculate the CRC */
        uchCRCHi = uchCRCLo ^ auchCRCHi[uIndex];
        uchCRCLo = auchCRCLo[uIndex] ;
    }
    return (uchCRCHi << 8 | uchCRCLo) ;
}

```

High-Order Byte Table

```

/* Table of CRC values for high-order byte */
static unsigned char auchCRCHi[] = {
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,
0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01,
0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,

```



```

0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81,
0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0,
0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01,
0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,
0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01,
0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,
0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0,
0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01,
0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81, 0x40, 0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41,
0x00, 0xC1, 0x81, 0x40, 0x01, 0xC0, 0x80, 0x41, 0x01, 0xC0, 0x80, 0x41, 0x00, 0xC1, 0x81,
0x40

```

```

};

```

Low-Order Byte Table

```

/* Table of CRC values for low-order byte */

```

```

static char auchCRCLo[] = {
0x00, 0xC0, 0xC1, 0x01, 0xC3, 0x03, 0x02, 0xC2, 0xC6, 0x06, 0x07, 0xC7, 0x05, 0xC5, 0xC4,
0x04, 0xCC, 0x0C, 0x0D, 0xCD, 0x0F, 0xCF, 0xCE, 0x0E, 0x0A, 0xCA, 0xCB, 0x0B, 0xC9, 0x09,
0x08, 0xC8, 0xD8, 0x18, 0x19, 0xD9, 0x1B, 0xDB, 0xDA, 0x1A, 0x1E, 0xDE, 0xDF, 0x1F, 0xDD,
0x1D, 0x1C, 0xDC, 0x14, 0xD4, 0xD5, 0x15, 0xD7, 0x17, 0x16, 0xD6, 0xD2, 0x12, 0x13, 0xD3,
0x11, 0xD1, 0xD0, 0x10, 0xF0, 0x30, 0x31, 0xF1, 0x33, 0xF3, 0xF2, 0x32, 0x36, 0xF6, 0xF7,
0x37, 0xF5, 0x35, 0x34, 0xF4, 0x3C, 0xFC, 0xFD, 0x3D, 0xFF, 0x3F, 0x3E, 0xFE, 0xFA, 0x3A,
0x3B, 0xFB, 0x39, 0xF9, 0xF8, 0x38, 0x28, 0xE8, 0xE9, 0x29, 0xEB, 0x2B, 0x2A, 0xEA, 0xEE,
0x2E, 0x2F, 0xEF, 0x2D, 0xED, 0xEC, 0x2C, 0xE4, 0x24, 0x25, 0xE5, 0x27, 0xE7, 0xE6, 0x26,
0x22, 0xE2, 0xE3, 0x23, 0xE1, 0x21, 0x20, 0xE0, 0xA0, 0x60, 0x61, 0xA1, 0x63, 0xA3, 0xA2,
0x62, 0x66, 0xA6, 0xA7, 0x67, 0xA5, 0x65, 0x64, 0xA4, 0x6C, 0xAC, 0xAD, 0x6D, 0xAF, 0x6F,
0x6E, 0xAE, 0xAA, 0x6A, 0x6B, 0xAB, 0x69, 0xA9, 0xA8, 0x68, 0x78, 0xB8, 0xB9, 0x79, 0xBB,
0x7B, 0x7A, 0xBA, 0xBE, 0x7E, 0x7F, 0xBF, 0x7D, 0xBD, 0xBC, 0x7C, 0xB4, 0x74, 0x75, 0xB5,
0x77, 0xB7, 0xB6, 0x76, 0x72, 0xB2, 0xB3, 0x73, 0xB1, 0x71, 0x70, 0xB0, 0x50, 0x90, 0x91,
0x51, 0x93, 0x53, 0x52, 0x92, 0x96, 0x56, 0x57, 0x97, 0x55, 0x95, 0x94, 0x54, 0x9C, 0x5C,
0x5D, 0x9D, 0x5F, 0x9F, 0x9E, 0x5E, 0x5A, 0x9A, 0x9B, 0x5B, 0x99, 0x59, 0x58, 0x98, 0x88,
0x48, 0x49, 0x89, 0x4B, 0x8B, 0x8A, 0x4A, 0x4E, 0x8E, 0x8F, 0x4F, 0x8D, 0x4D, 0x4C, 0x8C,
0x44, 0x84, 0x85, 0x45, 0x87, 0x47, 0x46, 0x86, 0x82, 0x42, 0x43, 0x83, 0x41, 0x81, 0x80,
0x40
};

```

5.2 Read Data Function

```

/*****
//   Parameter:
//   Addr -> Slave ID
//   StReg -> Starting Register Address
//   RegQuantities -> Register Quantities
//   MbsBuf -> Receive Data Buffer
*****/

bool ReadData(unsigned char Addr, unsigned short StReg,
              unsigned short RegQuantities, unsigned char* MbsBuf)
{
    unsigned char msg[8];
    unsigned char Func = 0x04;
    unsigned short Crc;

    msg[0] = Addr;
    msg[1] = Func;
    msg[2] = HIBYTE(StReg);
    msg[3] = LOBYTE(StReg);
    msg[4] = HIBYTE(RegQuantities);
    msg[5] = LOBYTE(RegQuantities);
    Crc = CRC16(msg,6);
    msg[6] = HIBYTE(Crc);
    msg[7] = LOBYTE(Crc);
    int snd = 8; /* byte number of buffer msg */
    int rcv = (5+(RegQuantities*2));
    /* Send snd bytes content of msg to COMM port */
    /* Receive rcv bytes of response from COMM port to MbsBuf */
    if (receiving data length is same as rcv)
        return true;
    else
        return false;
}

```

5.3 Convert Data Function

```

/*****
//   Parameter:
//   ValueRangeLo -> Minimum value of the value range
//   ValueRangeHi -> Maximum value of the value range
//   ScaleLo -> Minimum value of the scale value
//   ScaleHi -> Maximum value of the scale value
//   RegData -> Current register data from remote device
*****/

double ConvertData(double ValueRangeLo,
                   double ValueRangeHi,
                   double ScaleLo,
                   double ScaleHi,
                   double RegData)
{
    double ConvertValue;

    ConvertValue = (((RegData*(ScaleHi - ScaleLo))/
                     (ValueRangeHi - ValueRangeLo))
                   + ScaleLo);
    return ConvertValue;
}

```

5.4 Read AI Function¹

```

bool ReadAIData(void)
{
    unsigned char MsgBuf[40];
    unsigned char Addr = 1; /* Slave Id */
    unsigned short StartRegAdd = 2;
    unsigned short RegQuantities = 5;
    int ScaleLo, ScaleHi,
        ValueRangeLo, ValueRangeHi,
        AiData;
    unsigned short RegData;
}

```

```

// Read register data from remote device
ReadData(Addr, StartRegAdd, RegQuantities, MsgBuf);

// Step 1: Parsing data for AI1
RegData = MAKEWORD(MsgBuf[4], MsgBuf[3]);

// Step 2: Set value range
// Because AI data type was set as 2 bytes, the value range would be
// showing between -32768 to 32767
ValueRangeLo = -32768;
ValueRangeHi = 32767;

// Step 3: Set value range for scale
// The default of Sensor type in AI1 is set as 『 Thermocouple K Type 』 .
// Scale low value is showing "-120", scale high value is showing
// "1000"
// Please refer to Appendix B, it will explain that how to inquire AI
// range in PR, as for another scale range of AI, please refer to AI
// configuration
ScaleLo = -120;
ScaleHi = 1000;

// Step 4: Execute converted function
AiData = (int)ConvertData(ValueRangeLo,
                          ValueRangeHi,
                          ScaleLo,
                          ScaleHi,
                          RegData);

// Step 5: Repeat Step 1 to Step 4 for getting another AI data

* Note: Please refer to Appendix C for more details.
}

```

5.5 Read Math Function¹

```

bool ReadMathData(void)
{

```

```

unsigned char MsgBuf[120];
unsigned char i, j;
unsigned char Addr = 1; /* Slave Id */
unsigned short StartRegAdd = 201;
unsigned short RegQuantities = (10*2); // Math data is float type, so
each Math value take two registers
double ScaleLo, ScaleHi, ValueRangeLo, ValueRangeHi;
double RegData, MathData;

```

```

// Read register data from remote device
ReadData(Addr, StartRegAdd, RegQuantities, MsgBuf);

```

// Step 1: Set value range

```

// The default of Math data type was set as 4 bytes, the value range
// will be showing between 0 to 4294967295
ValueRangeLo = 0;
ValueRangeHi = 4294967295;

```

// Step 2: Set value range for scale

```

// When the property of "Transformation" in scale was set as disable,
// the range will be showing -2147483648 to 2147483647
// If the property of "Transformation" in Scale was set as "Value" or
// "Math Channel", please refer to Appendix D
ScaleLo = -2147483648;
ScaleHi = 2147483647;

```

// Step 3: Please refer to the decimal value for the conversion of each

Math

```

switch(decimal value)
{
    case 1:
        ScaleLo = ScaleLo / 10;
        ScaleHi = ScaleHi / 10;
        break;
    case 2:
        ScaleLo = ScaleLo / 100;
        ScaleHi = ScaleHi / 100;
        break;
}

```

```

case 3:
    ScaleLo = ScaleLo / 1000;
    ScaleHi = ScaleHi / 1000;
    break;
case 4:
    ScaleLo = ScaleLo / 10000;
    ScaleHi = ScaleHi / 10000;
    break;
case 5:
    ScaleLo = ScaleLo / 100000;
    ScaleHi = ScaleHi / 100000;
    break;
default:
    break;
}

```

// Step 4: Parsing data for Math1

```

RegData = (UINT)MAKELONG(MAKEWORD(MsgBuf[j+1],
                                   MsgBuf[j]),
                        MAKEWORD(MsgBuf[j+3],
                                   MsgBuf[j+2]));

```

// Step 5: Execute converted function

```

MathData = ConvertData(ValueRangeLo,
                        ValueRangeHi,
                        ScaleLo,
                        ScaleHi,
                        RegData);

```

// Step 6: Repeat Step 1 to Step 5 for getting another data of Math

* *Note: Please refer to Appendix D for more details.*

```

}

```

5.6 Read DI Function¹

```

bool ReadDIData(void)
{

```

```

unsigned char MsgBuf[96];
unsigned char Addr = 1; /* Slave Id */
unsigned short StartRegAdd = 50;
unsigned short RegQuantities = 5;
bool DiData;

// Read register data from remote device
ReadData(Addr, StartRegAdd, RegQuantities, MsgBuf);

// Step 1: Parsing data for DI1
DiData = (bool)MAKEWORD(MsgBuf[4], MsgBuf[3]);

// Step 2: Repeat Step 1 for getting another DI data
}

```

5.7 Read AO Function¹

```

bool ReadAOData(void)
{
    unsigned char MsgBuf[48];
    unsigned char Addr = 1; /* Slave Id */
    unsigned short StartRegAdd = 601;
    unsigned short RegQuantities = 5;
    unsigned short RegData;
    float AoData;

    // Read register data from remote device
    ReadData(Addr, StartRegAdd, RegQuantities, MsgBuf);

    // Because the AO expression is specific, so we need using specific
    // expression to convert the value as following:
    // Step 1: Parsing data for AO1
    RegData = MAKEWORD(MsgBuf[4], MsgBuf[3]);

    // Step2: To do converted expression for AO1
    AoData = ((RegData * 65.535)/65535)-32.768;

    // Step 3: Repeat Step 1 to Step 2 for getting another AO data
}

```

** Note: Please refer to Appendix C for more details.*

}

5.8 Read DO Function¹

```
bool ReadDOData(void)
{
    unsigned char MsgBuf[48];
    unsigned char Addr = 1; /* Slave Id */
    unsigned short StartRegAdd = 74;
    unsigned short RegQuantities = 5;
    bool DoData;

    // Read register data from remote device
    ReadData(Addr, StartRegAdd, RegQuantities, MsgBuf);

    // Step 1: Parsing data for DO1
    DiData = (bool)MAKEWORD(MsgBuf[4], MsgBuf[3]);

    // Step 2: Repeat Step 1 for getting another DO data
}
```

5.9 Read External Function¹

```
bool ReadExtData(void)
{
    unsigned char MsgBuf[128];
    unsigned char Addr = 1; /* Slave Id */
    unsigned short StartRegAdd = 401;
    unsigned short RegQuantities = 20;
    unsigned short ExtData;

    // Read register data from remote device
    ReadData(Addr, StartRegAdd, RegQuantities, MsgBuf);

    // Step 1: Parsing data for Ext1
    DiData = MAKEWORD(MsgBuf[4], MsgBuf[3]);
}
```


// Step 2: Repeat Step 1 for getting another Ext data

※ Note: Because the Input Register Ext data is same like Holding Register Ext data, so the data type of the ExtData must according to the setting of real case, if the data type of ExtData is 4 bytes, please refer to "ReadMathData" function in Step 1, Step 2, Step 4 and Step 5 to convert data type of customer requirement (Such as: Int32 or UInt32 or float data type).

※ Note: If user went to use Ext register to receive AI, DI, AO, DO and Math data of the PR06 or PR20 or PR48, please refer to Appendix F, Appendix G, Appendix H and Appendix I for more details.

}

*1: Above sample code is according to the PR20 setting, if user need changing the MsgBuf size and RegQuantities value from PR06 or PR48, please refer to the user manual.

Appendix A

Modbus RTU Slave / TCP Server Register data type table

Field Name	Data Size	Data Type	Note
AI	2 Bytes	WORD	Little Endian
Math	4 Bytes	UINT32	Little Endian
DI	2 Bytes	WORD	Little Endian
AO	2 Bytes	WORD	Little Endian
DO	2 Bytes	WORD	Little Endian
External	2 Bytes	WORD	Little Endian

Table A-1

Appendix B

Inquire AI range

i. Press 『Menu』 -> 『More』 -> 『Config』

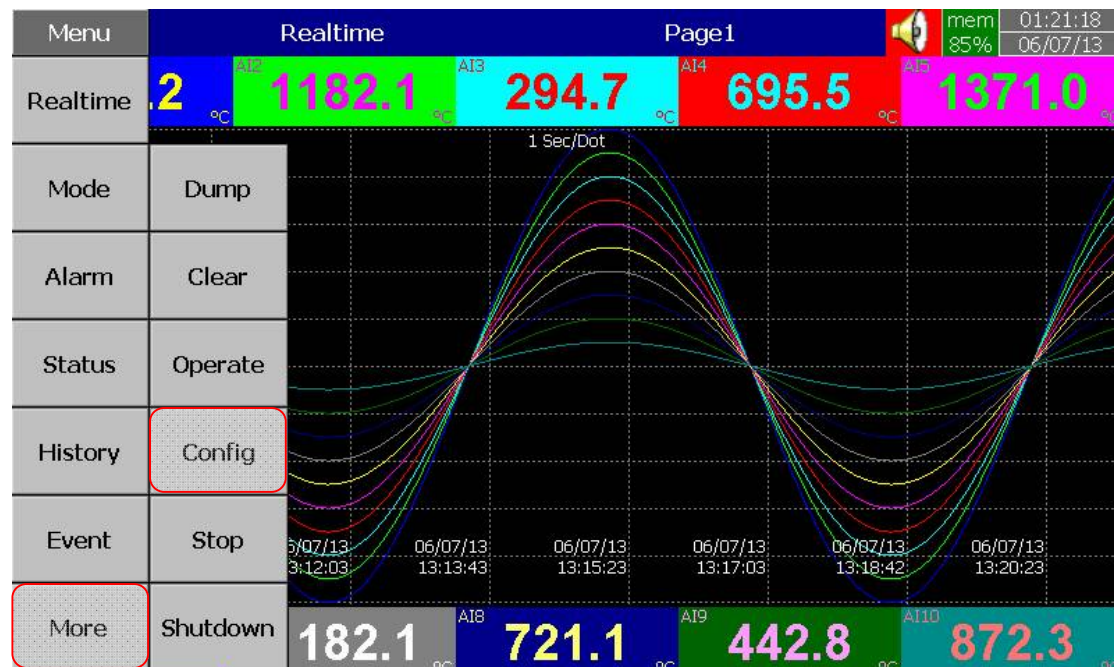


Fig. B-1

ii. Please select 『AI』

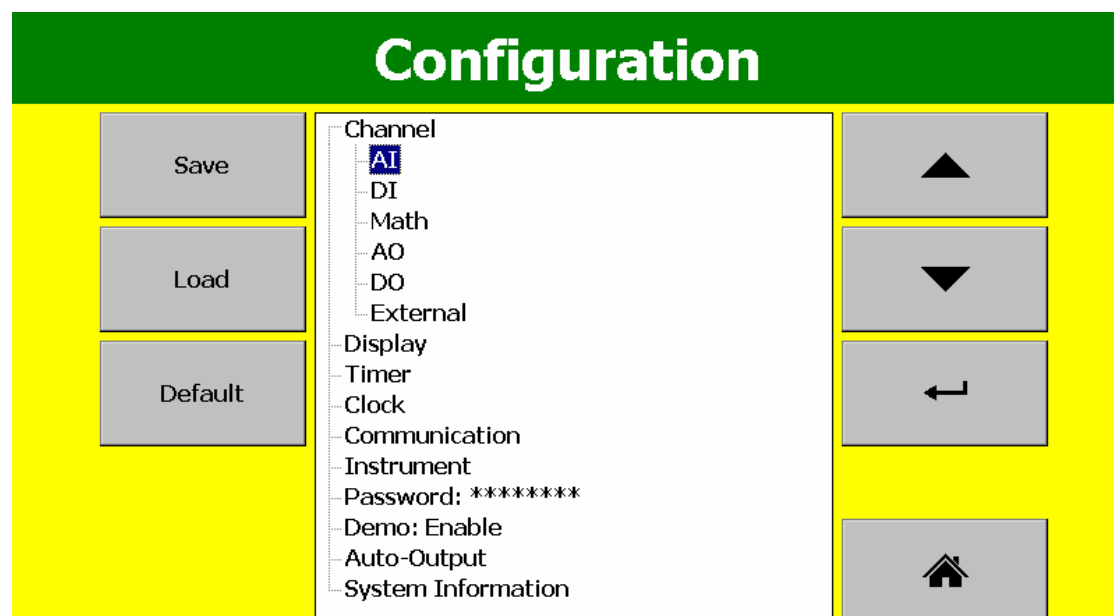


Fig. B-2

iii. We can see the value of AI in following screen

The screenshot displays the configuration screen for AI1. At the top, there is a header bar with 14 numbered tabs (1-14) and navigation arrows. The main content area lists the following parameters:

- Name: AI1
- Desc:
- Type: Enable
- Filter: Disable
- Log
 - DataType: 2 Byte
 - Value Range: -32768 ~ 32767
 - Trigger: by Time
 - Method: Instant
 - Speed: 1 Sec/Dot
 - Allow Fast Mode: true
- Sensor
 - Type: Thermocouple J Type
 - Unit: °C
 - Range: -120.0~1000.0

On the right side of the screen, there are three vertically stacked buttons: an up arrow, a down arrow, and a left arrow. At the bottom, there is a navigation bar with four buttons: a left arrow, a right arrow, a 'Copy' button, and a 'Back' button. Below the left and right arrow buttons, there are callout boxes labeled 'Previous AI' and 'Next AI' respectively.

Fig. B-3

The screenshot displays the configuration screen for AI2. It has the same layout as Fig. B-3, with the following parameters:

- Name: AI2
- Desc:
- Type: Enable
- Filter: Disable
- Log
 - DataType: 2 Byte
 - Value Range: -32768 ~ 32767
 - Trigger: by Time
 - Method: Instant
 - Speed: 1 Sec/Dot
 - Allow Fast Mode: true
- Sensor
 - Type: Thermocouple K Type
 - Unit: °C
 - Range: -200.0~1370.0

The right side features the same three buttons (up, down, left). The bottom navigation bar also has the same four buttons (left arrow, right arrow, Copy, Back). In this screen, the 'Range' parameter for the sensor is highlighted with a red box.

Fig. B-4

Appendix C

AI Convert Example

How to convert the value of getting from the master site, please refer to the following formula:

When the value of AI1 range is set between -120 ~ 1000 (Please refer to **Fig. B-3**),

If the AI value is set as 0:

$$\begin{aligned}\text{AI value} &= (((0 * (1000 - (-120)) / 65535) + (-120)) \\ &= ((0 / 65535) + (-120)) \\ &= -120\end{aligned}$$

If the AI value is set as 65535:

$$\begin{aligned}\text{AI value} &= (((65535 * (1000 - (-120)) / 65535) + (-120)) \\ &= (((65535 * 1120) / 65535) + (-120)) \\ &= ((73399200 / 65535) + (-120)) \\ &= (1120 + (-120)) \\ &= 1000\end{aligned}$$

If the AI value is set as 32768:

$$\begin{aligned}\text{AI value} &= (((32768 * (1000 - (-120)) / 65535) + (-120)) \\ &= (((32768 * 1120) / 65535) + (-120)) \\ &= ((36700160 / 65535) + (-120)) \\ &= (560 + (-120)) \\ &= 440\end{aligned}$$

Appendix D

Math Convert Sample

i.1 Press 『Menu』 -> 『More』 -> 『Config』

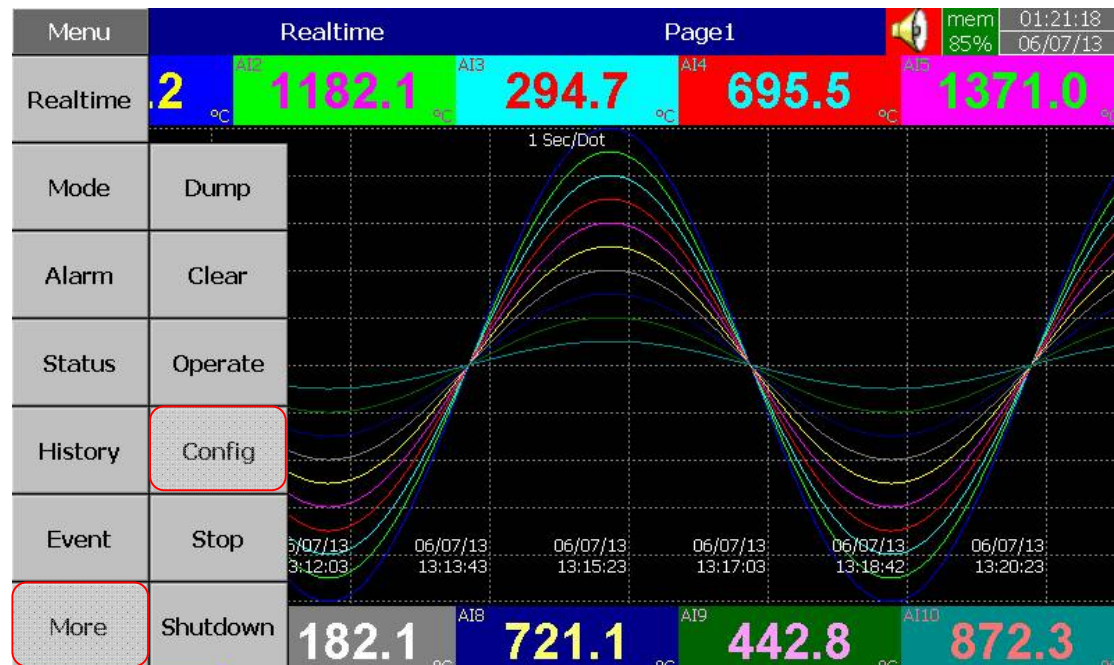


Fig. D-1

ii.1 Please select 『Math』

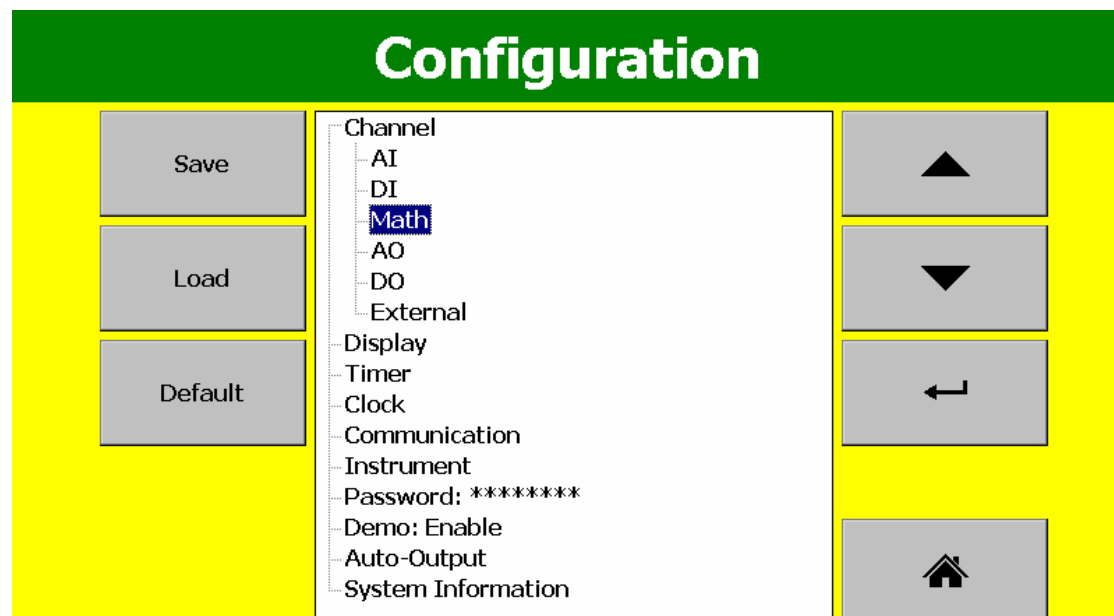


Fig. D-2

1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Name: Math1															
Desc:															
Type: Math															
Log															
DataType: 4 Byte															
Value Range: -3.4E+38 ~ 3.4E+38															
Trigger: by Time															
Method: Instant															
Speed: 1 Sec/Dot															
Expression: AI11-AI1															
Scale															
Unit:															
Transformation: Disable															
Decimal: 1															
Range: -214748364.8 ~ 214748364.7															
◀				▶				Copy						Back	

Fig. D-3

In the **Fig. D-4** and **Fig. D-5**, we can see the Transformation of Scale in Math have three types can choose, so we will be showing three samples for explanation, to make the value in the master site can match with the value of PR site.

1	2	3	4	5	6	7	8	9	10	11	12	13	14		
Name: Math1															
Desc:															
Type: Math															
Log															
DataType: 4 Byte															
Value Range: -3.4E+38 ~ 3.4E+38															
Trigger: by Time															
Method: Instant															
Speed: 1 Sec/Dot															
Expression: AI11-AI1															
Scale															
Unit:															
Transformation: Disable															
Decimal: 1															
Range: -214748364.8 ~ 214748364.7															
◀				▶				Copy						Back	

Fig. D-4

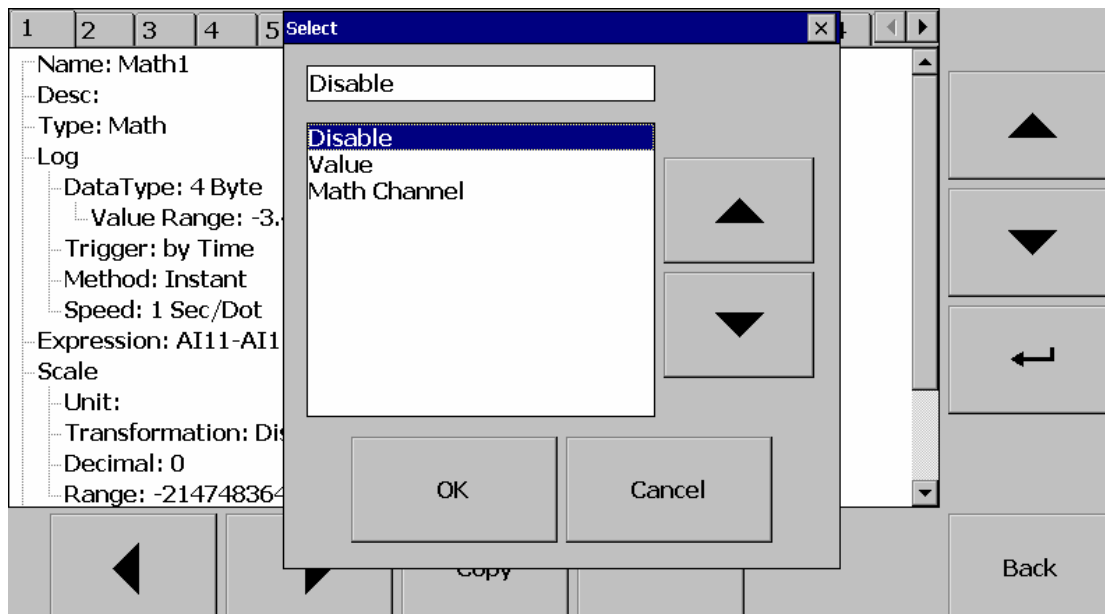


Fig. D-5

iii.1 Transformation : Disable

iii.1.1 Modify the content of expression in Math1 to 10 as following showing

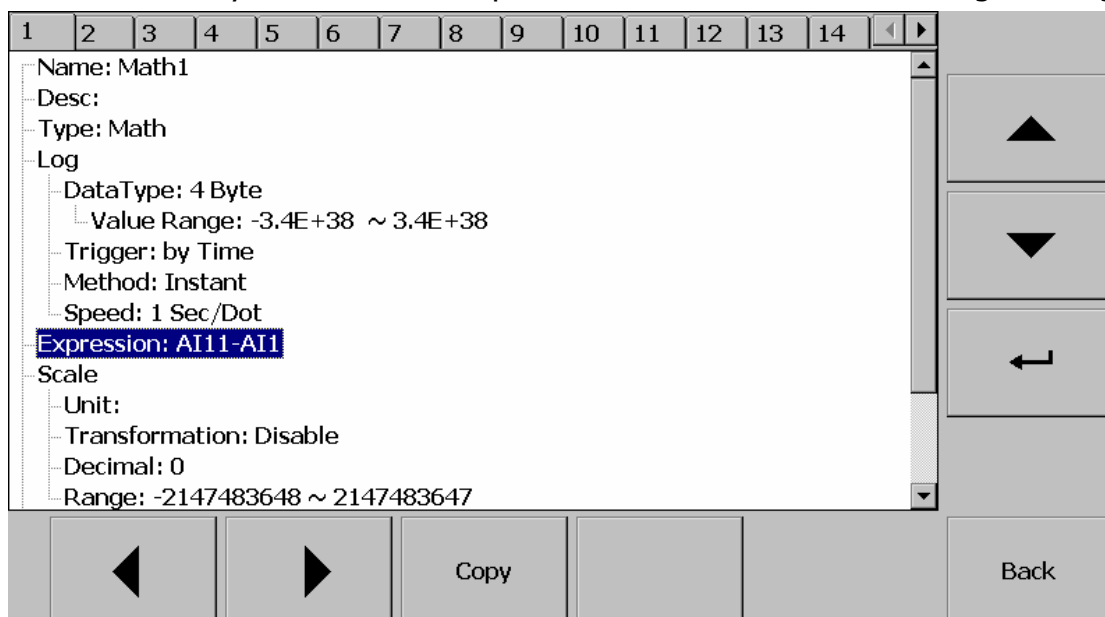


Fig. D-6

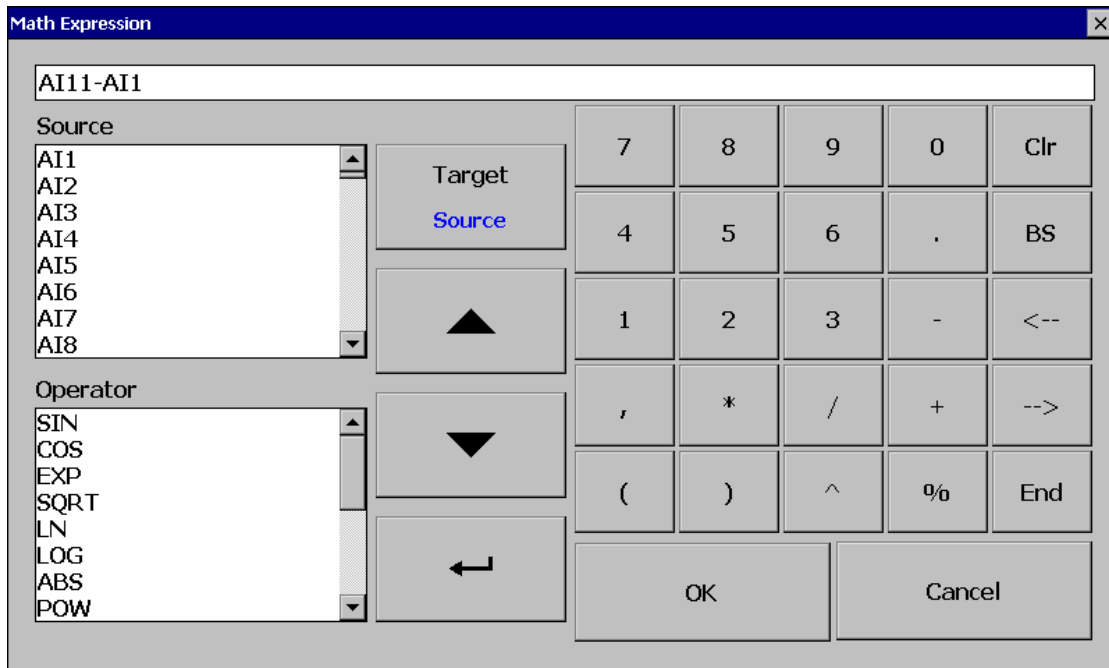


Fig. D-7

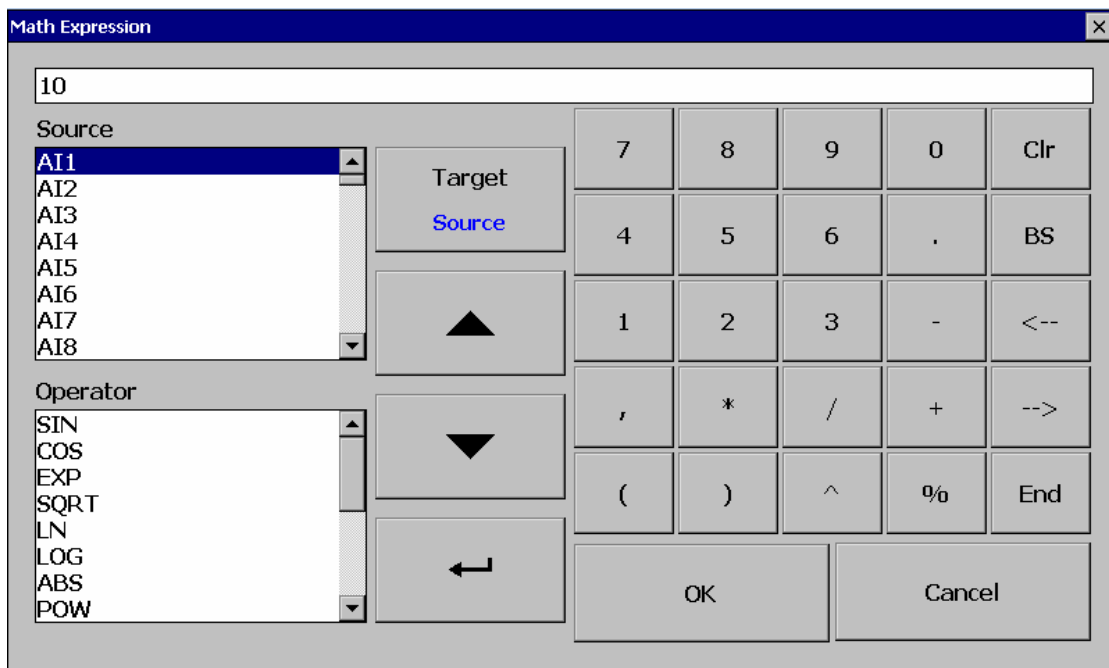


Fig. D-8

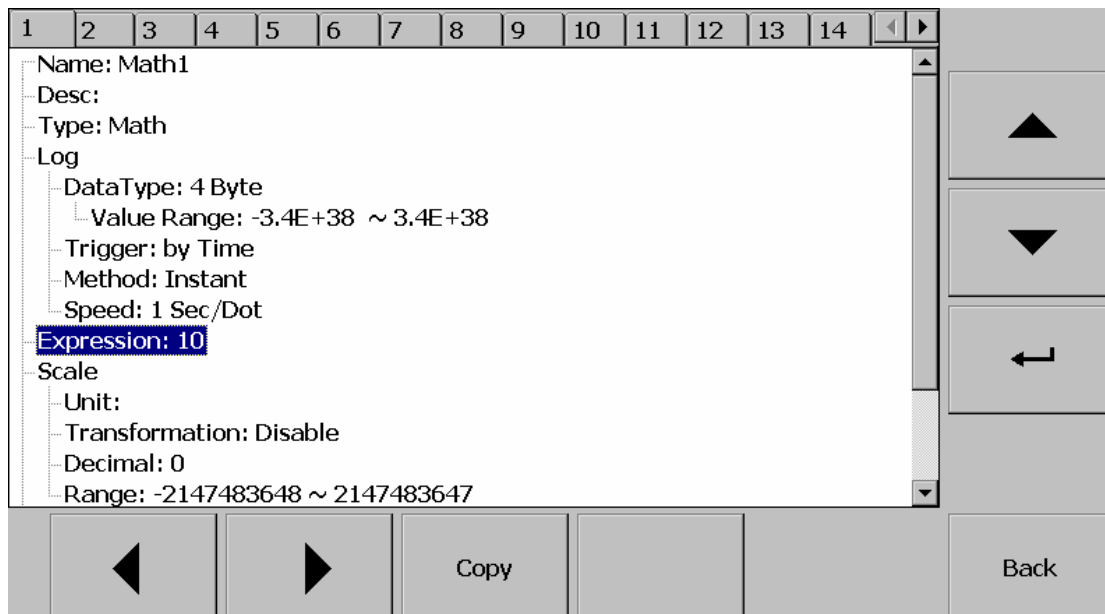


Fig. D-9

iii.1.2 Please come back to the "Overview" page, we can see the value In Math1 is showing "10"

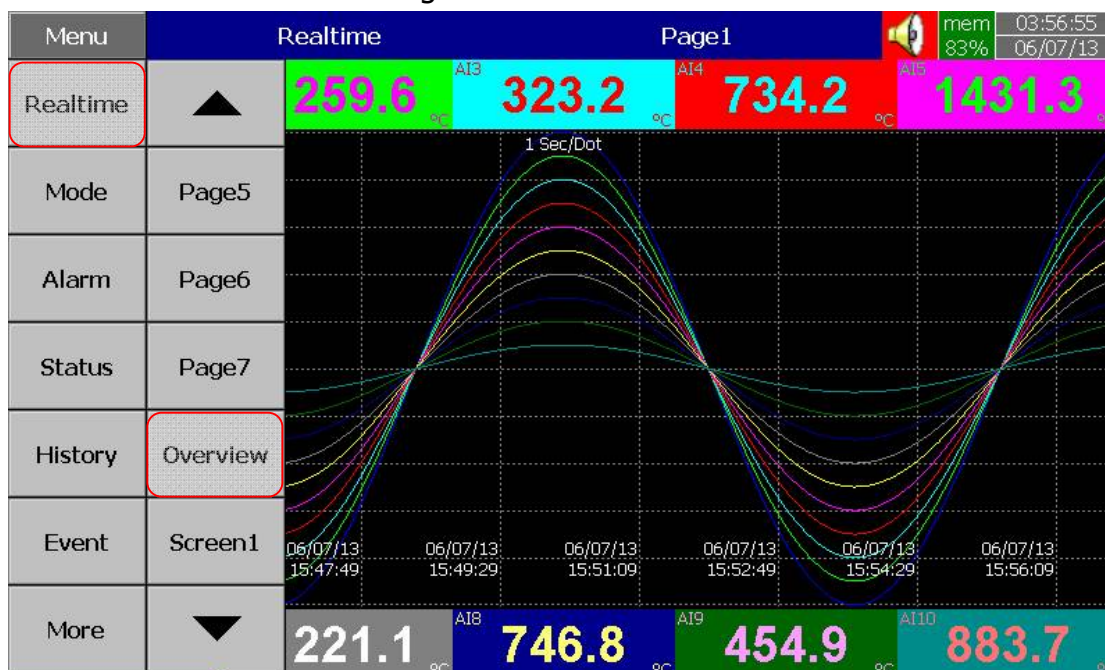


Fig. D-10

↑	AI41 321.1 °C	AI42 596.3 °F	AI43 253.5 °C	AI44 476.3 °F	AI45 888.8 °C
	AI46 1600.8 °F	AI47 53.34 %	AI48 52.50 %	Math1 10	Math2 1767.7
↓	Math3 558.6	Math4 980.0	Math5 1739.5	Math6 1532.0	Math7 1373.4
	Math8 1102.2	Math9 509.5	Math10 845.8	Math11 60.7	Math12 58.5
↓	Math13 56.4	Math14 54.3	Math15 52.1	Math16 39.3	Math17 41.4
	Math18 43.6	Math19 45.7	Math20 47.9	Counter1 0	Counter2 0
	Counter3 0	Counter4 0	Counter5 0	Counter6 0	Counter7 0
	Counter8 0	Counter9 0	Counter10 0	Counter11 0	Counter12 0

iii.1.3 Please go to the configuration of Math1 page and check the decimal value

1	2	3	4	5	6	7	8	9	10	11	12	13	14	◀	▶
Name: Math1 Desc: Type: Math Log DataType: 4 Byte Value Range: $-3.4E+38 \sim 3.4E+38$ Trigger: by Time Method: Instant Speed: 1 Sec/Dot Expression: 10 Scale Unit: Transformation: Disable Decimal: 0 Range: $-2147483648 \sim 2147483647$															

◀ ▶

Copy

Back

If the decimal value is set as "0", the value don't need to do any conversion in the master site, if the decimal value is set as "1", the value of getting from the master site must to be divided 10 then it just can match with the value in Math1 of PR, if the decimal value is set as "2", then the value of getting from the master site must to be divided 100, the it just can match with the value in Marth1 of PR, if the decimal value is set as "5", the value of getting from the

master site must to be divided 10000, then it just can match with the value in Math1 PR.

iii.2 Transformation : Value

iii.2.1 Change the Transformation type to "Value"

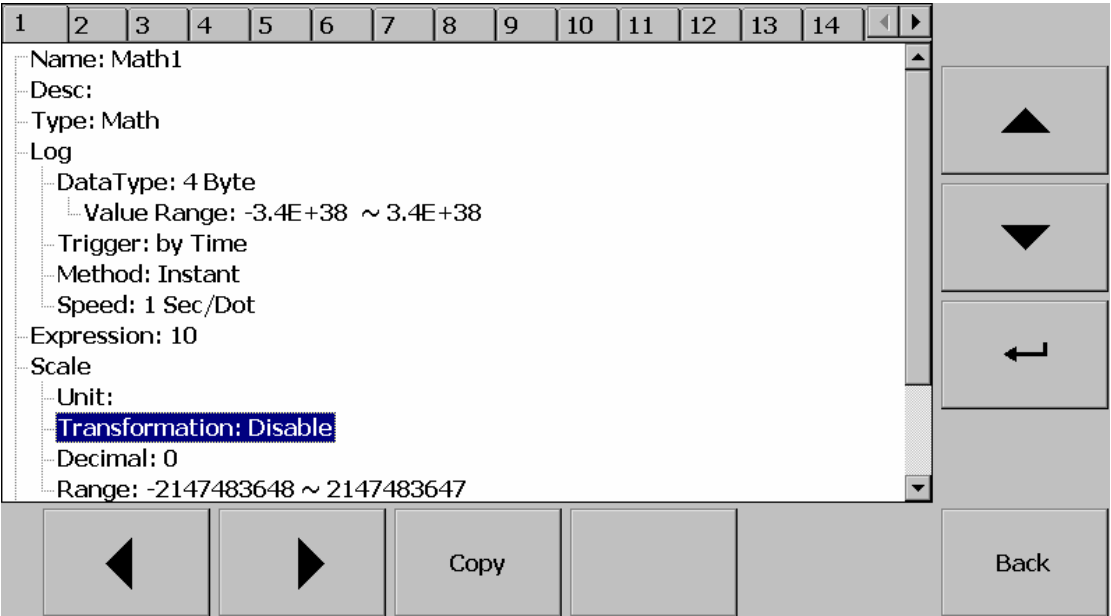


Fig. D-13

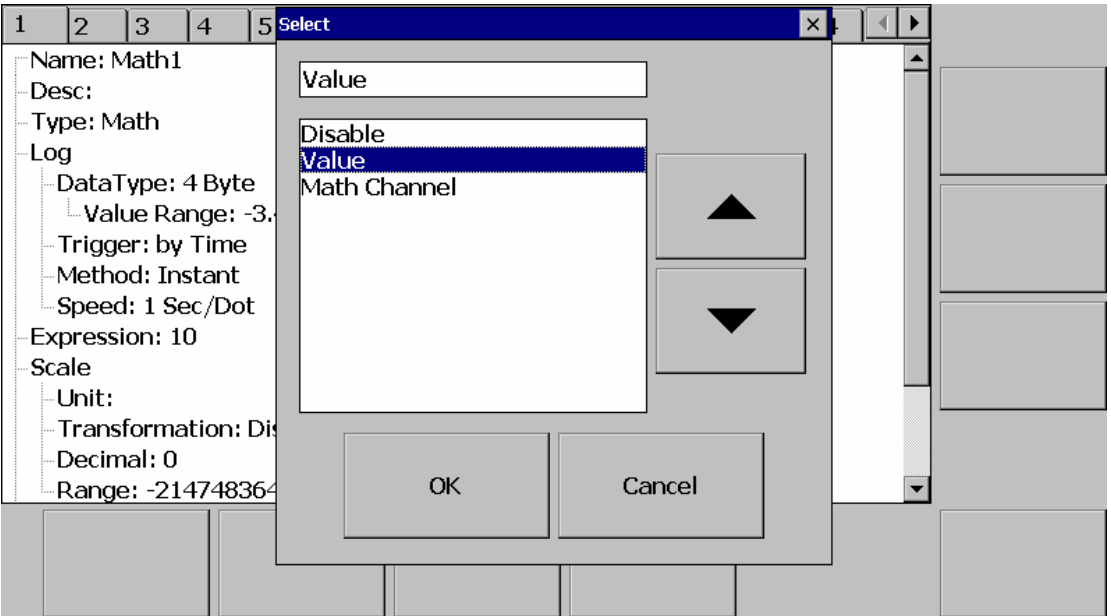


Fig. D-14

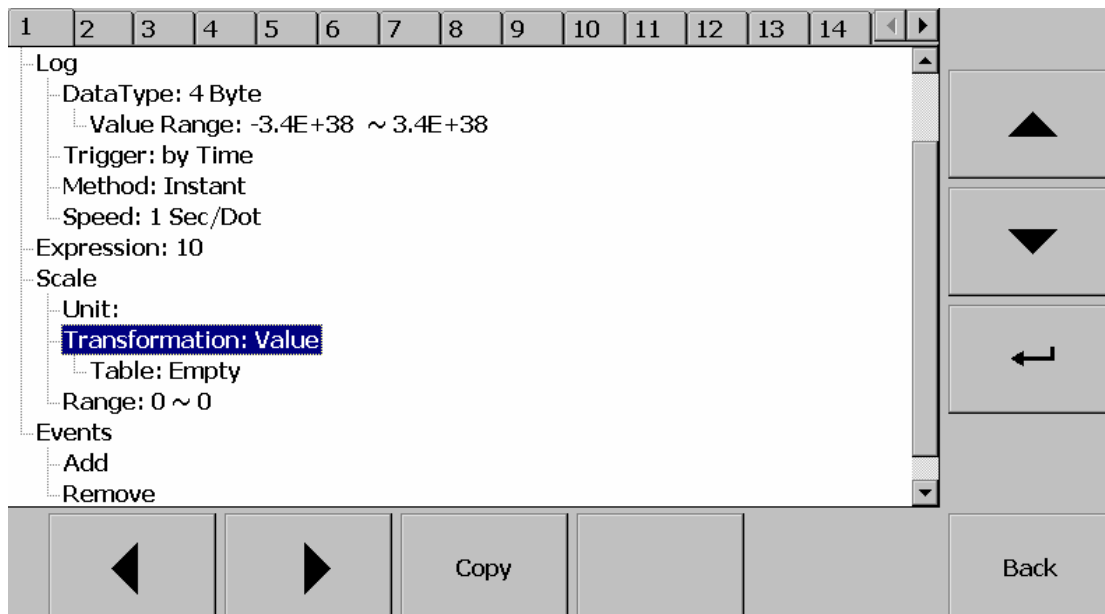


Fig. D-15

iii.2.2 Create table of scale range table for conversion in Math1

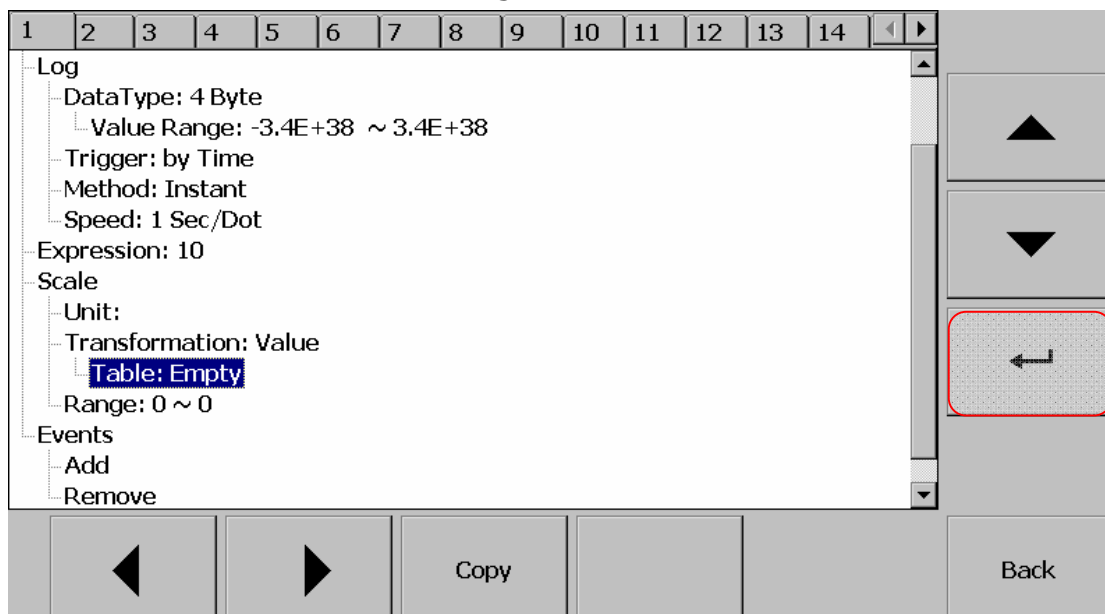


Fig. D-16

Press "Add" button to add scale range

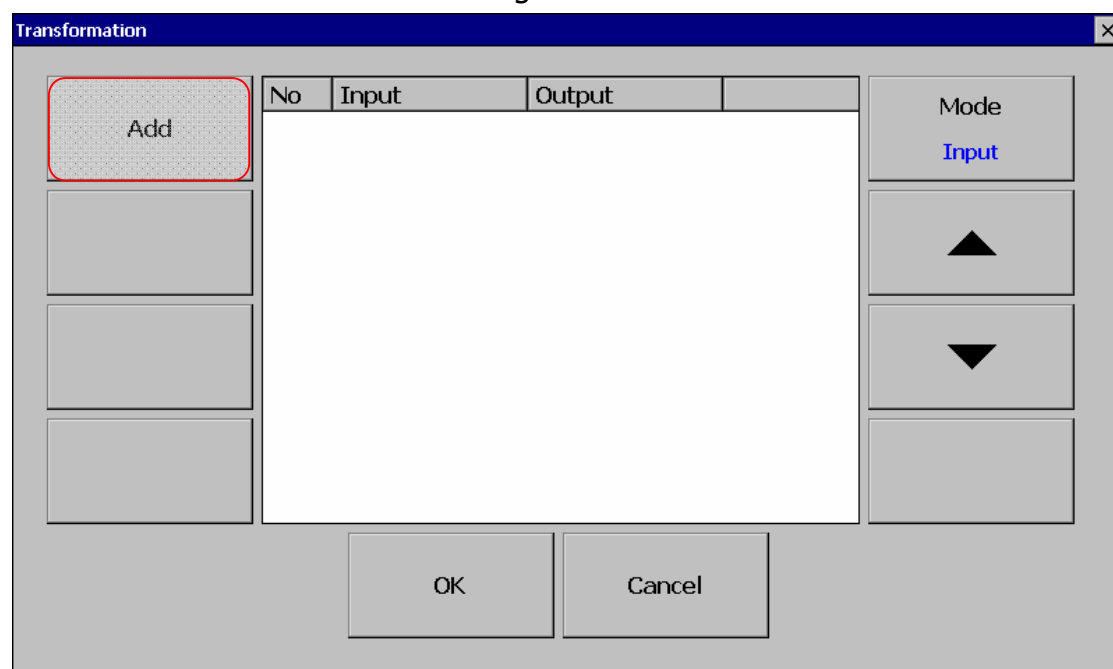


Fig. D-17

Press "Enter" button to modify "Input" value

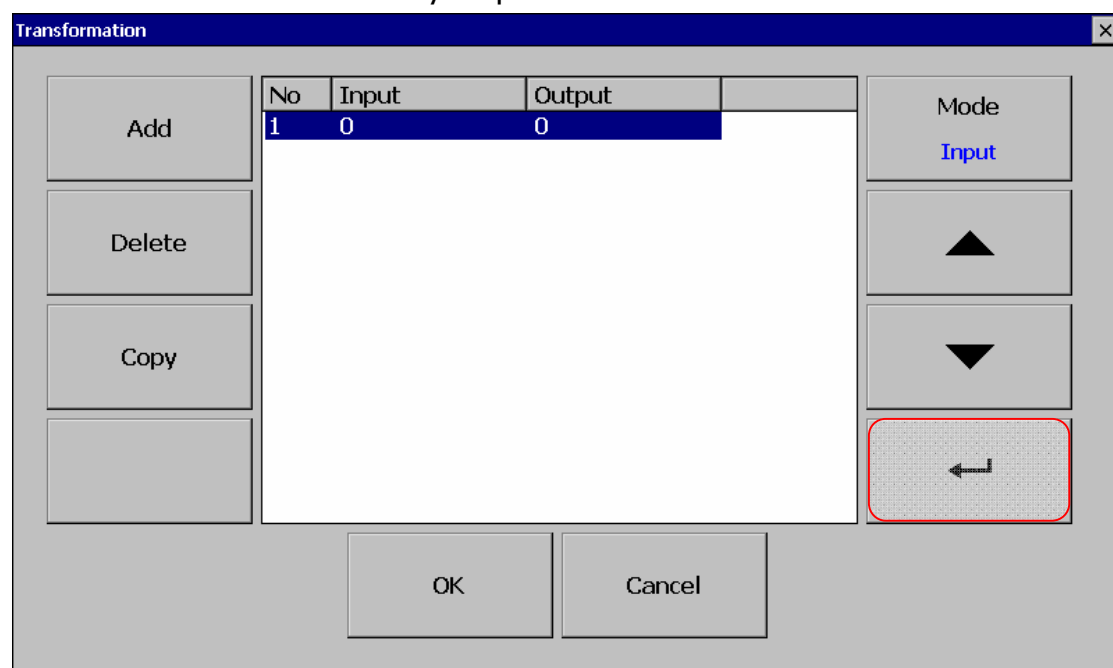


Fig. D-18

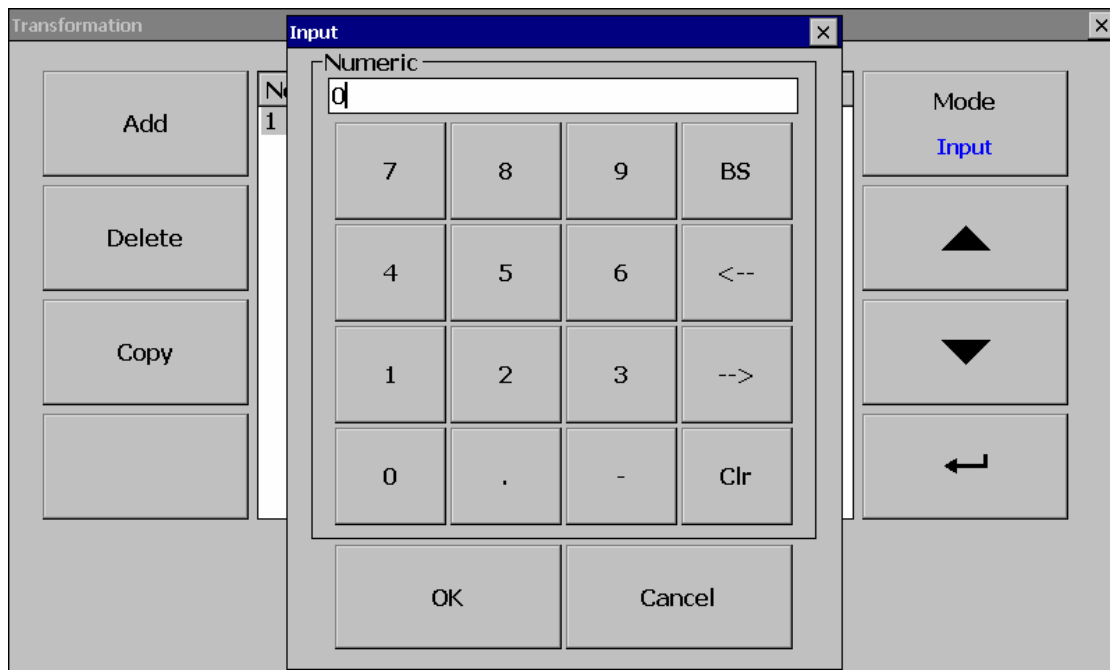


Fig. D-19

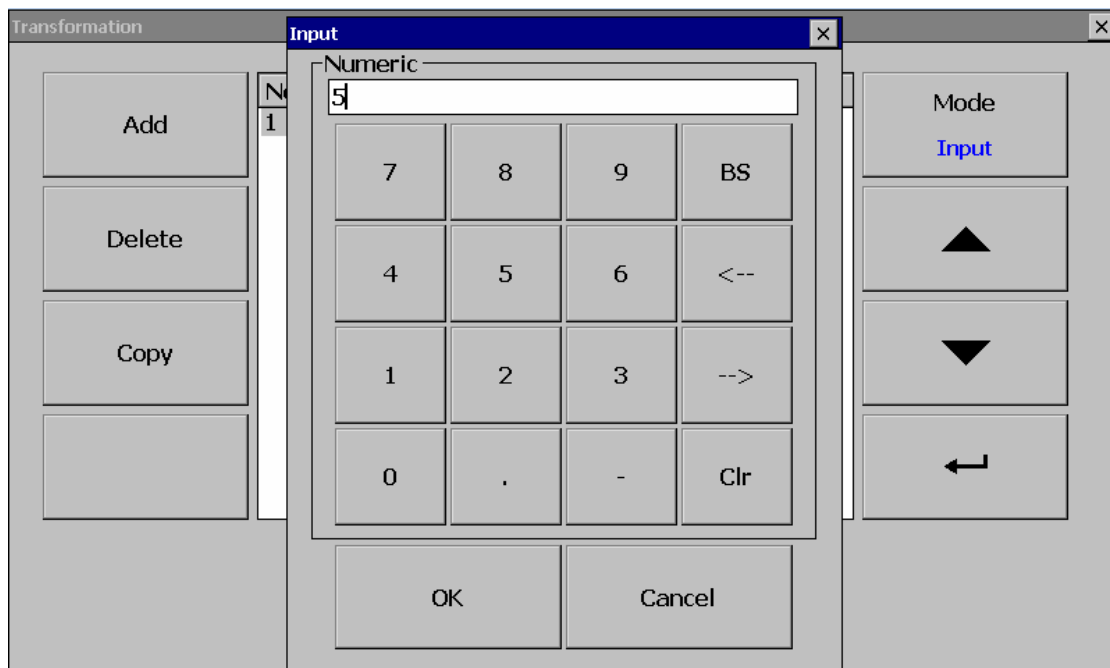


Fig. D-20

Press "Mode" button from "Input" to "Output"

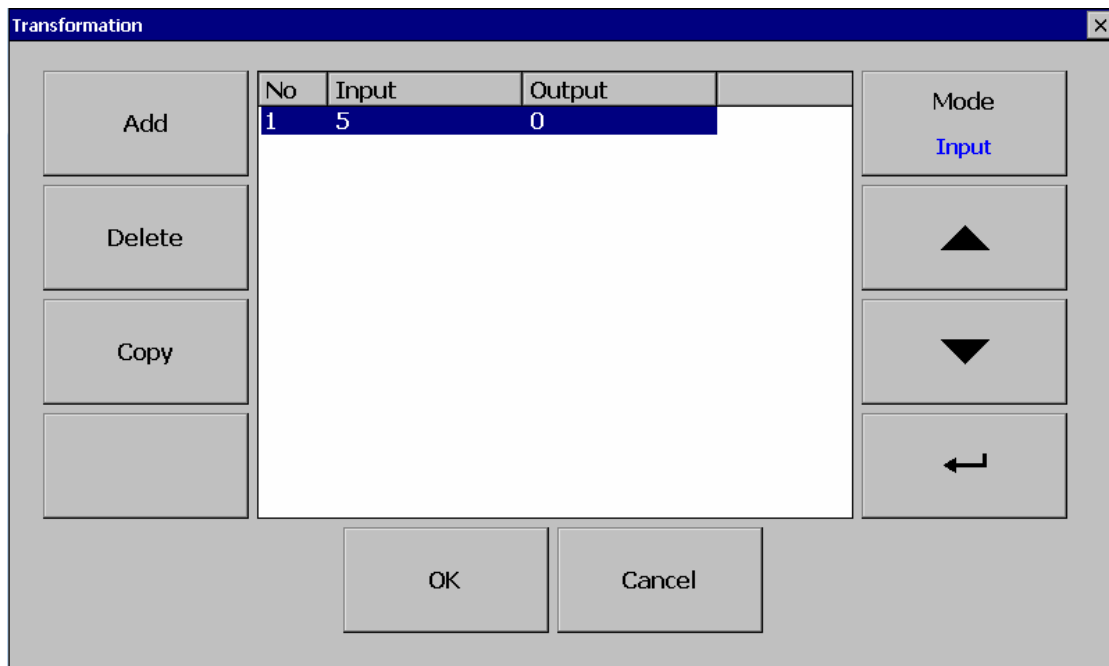


Fig. D-21

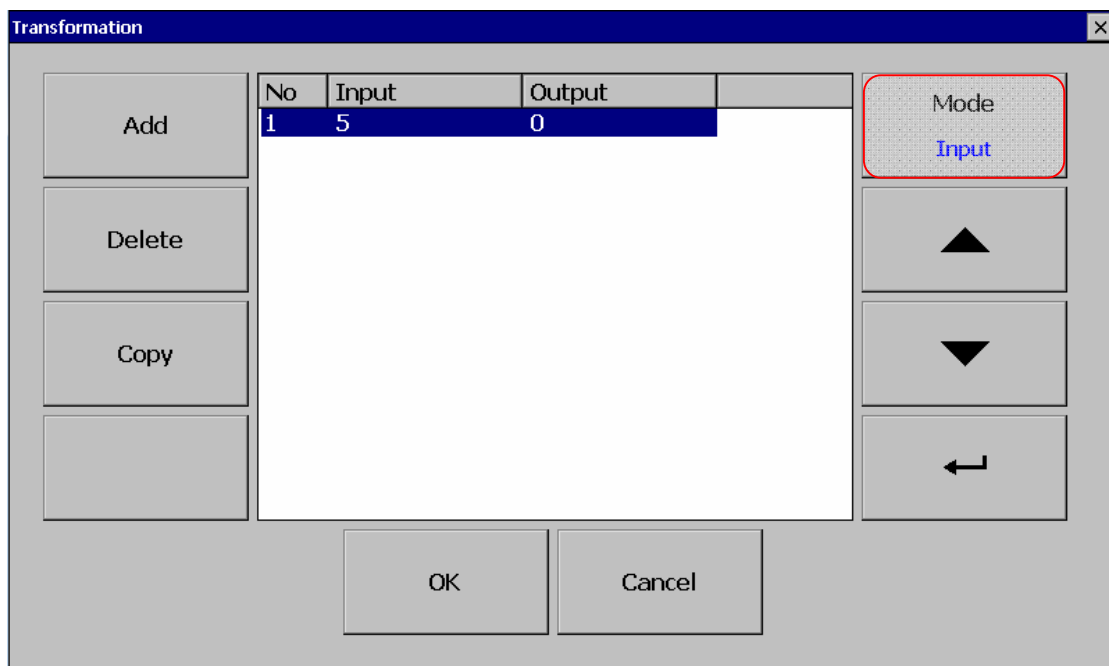


Fig. D-22

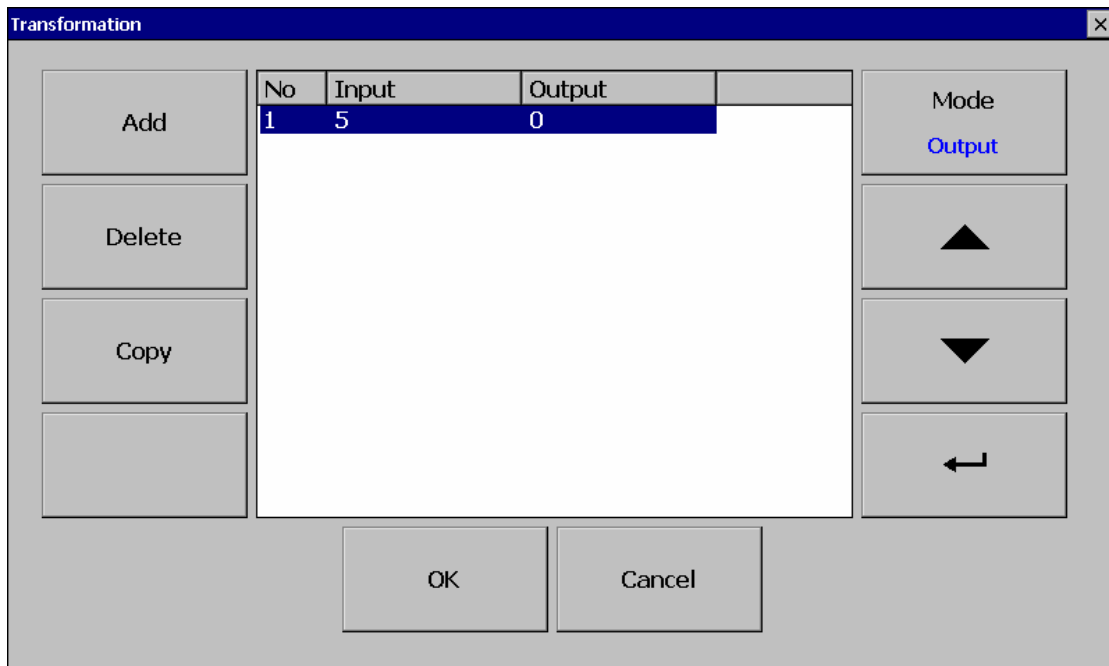


Fig. D-23

Press "Enter" button to modify "Output" value

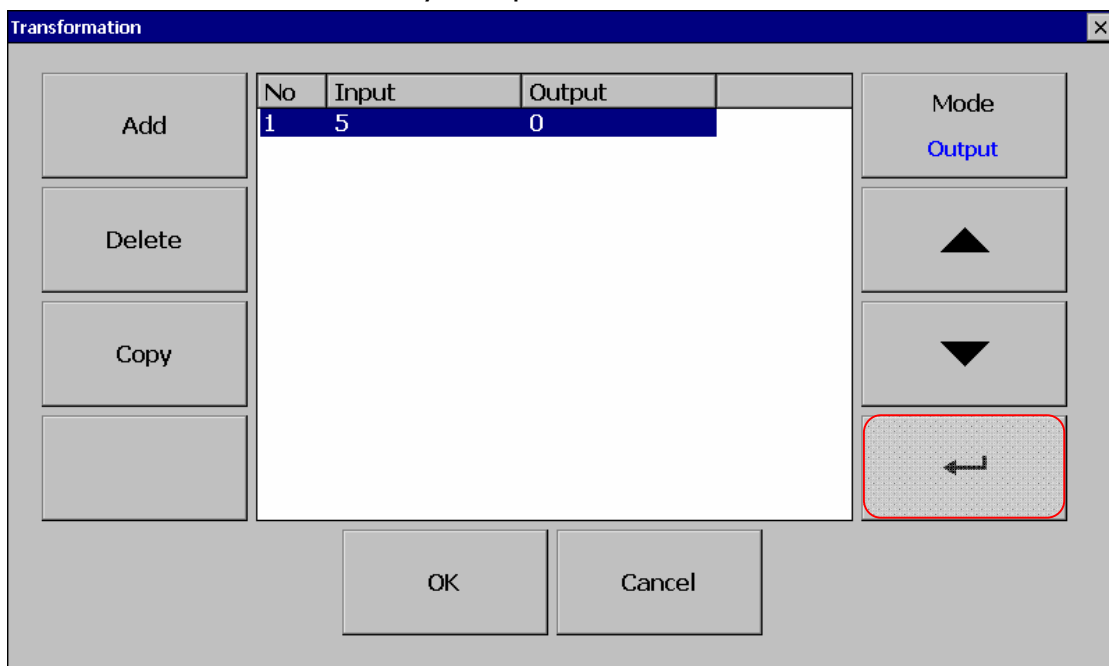


Fig. D-24

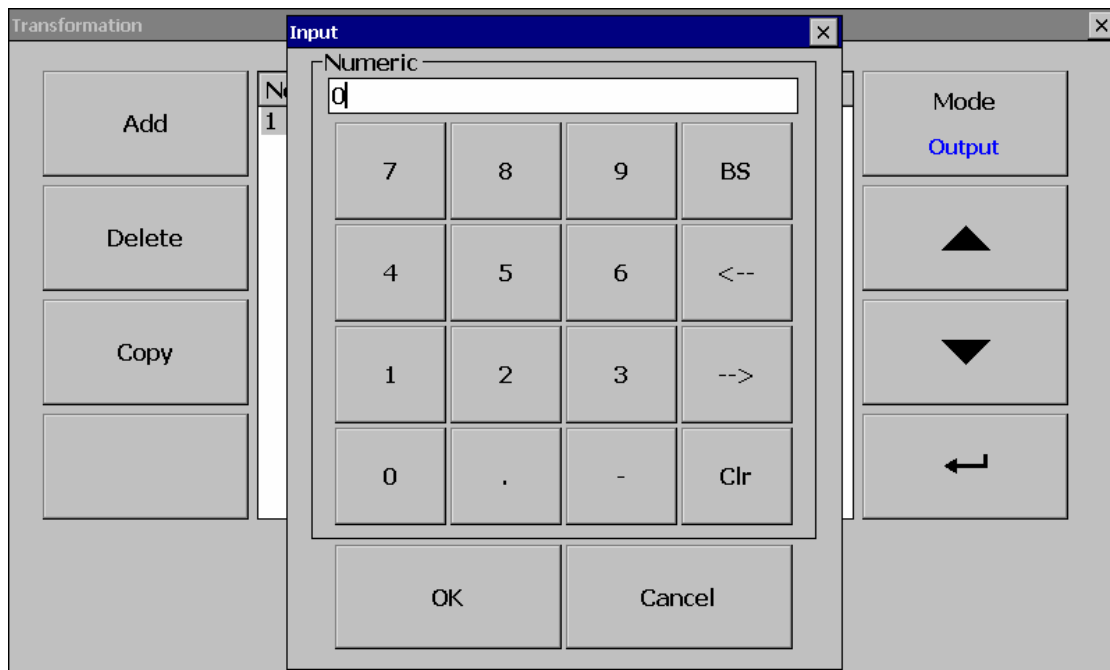


Fig. D-25

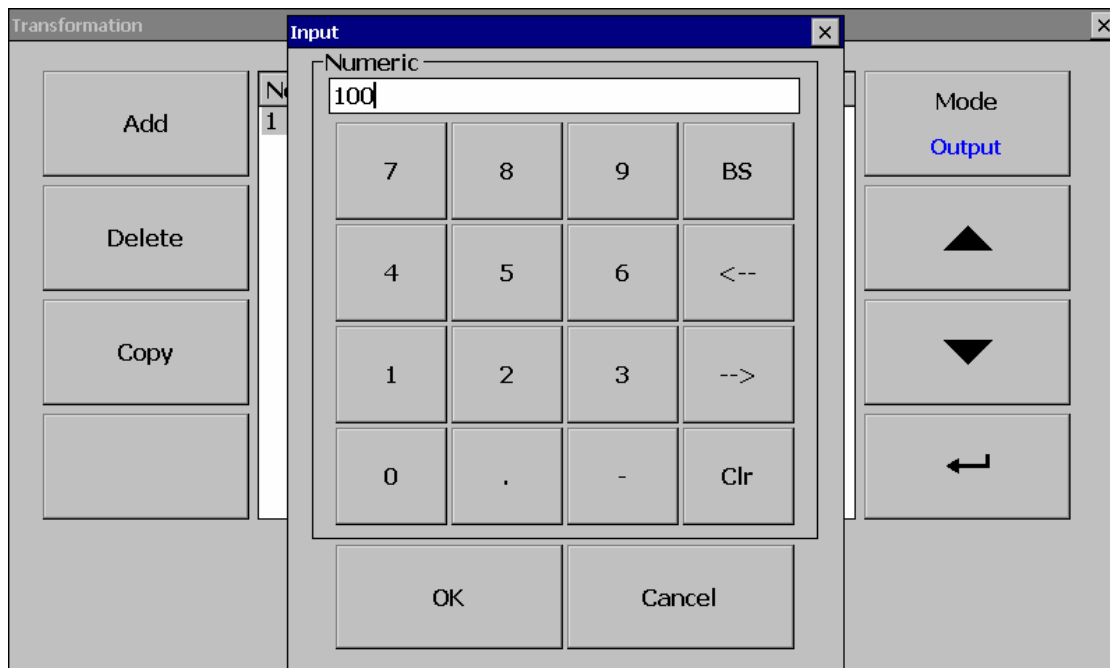


Fig. D-26

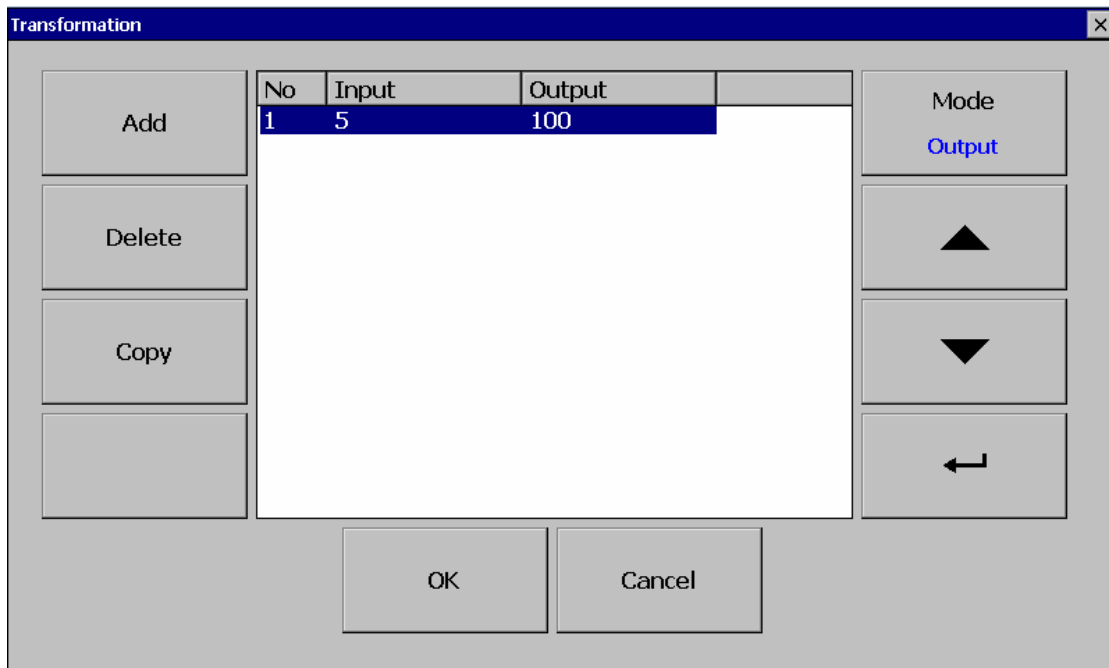


Fig. D-27

Please repeat **Fig. D-17** to **Fig D-27** step to add another scale range, and please notice the scale range need two points at least to convert value. In here, we will create 3 points to do conversion for this sample.

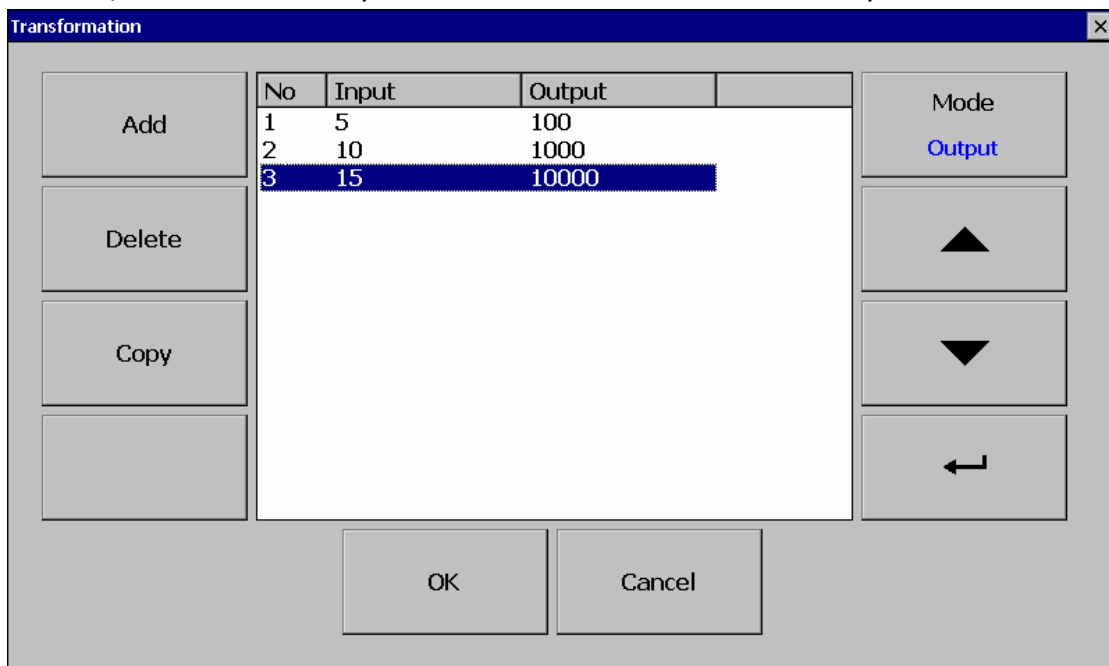


Fig. D-28

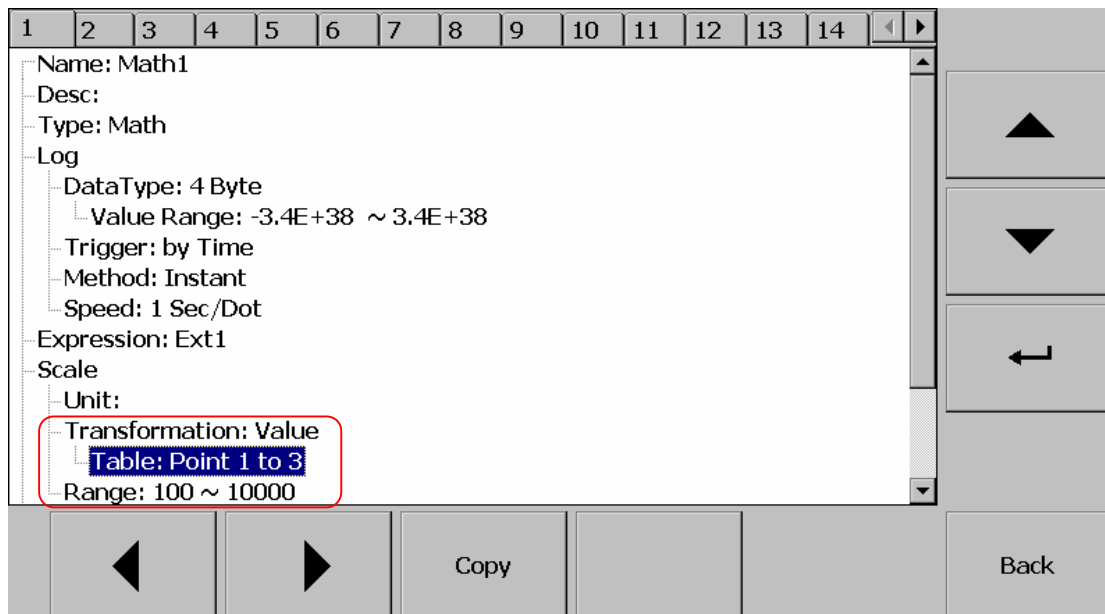


Fig. D-29

iii.2.3 Modify expression value to "5" and check the Math1 value in "Overview" page

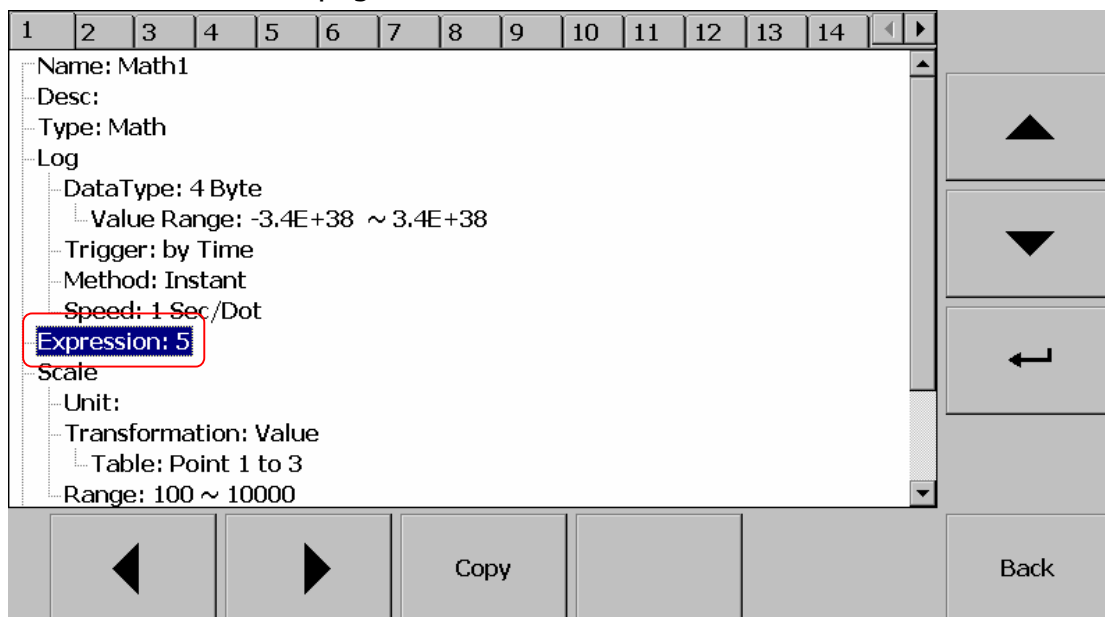


Fig. D-30

↑	AI41 321.1 °C	AI42 596.3 °F	AI43 253.5 °C	AI44 476.3 °F	AI45 888.8 °C
↑	AI46 1600.8 °F	AI47 53.34 %	AI48 52.50 %	Math1 100	Math2 601.1
↓	Math3 129.2	Math4 401.1	Math5 836.7	Math6 801.2	Math7 788.8
↓	Math8 644.0	Math9 327.4	Math10 674.6	Math11 60.7	Math12 58.5
	Math13 56.4	Math14 54.3	Math15 52.1	Math16 39.3	Math17 41.4
	Math18 43.6	Math19 45.7	Math20 47.9	Counter1 0	Counter2 0
	Counter3 0	Counter4 0	Counter5 0	Counter6 0	Counter7 0
	Counter8 0	Counter9 0	Counter10 0	Counter11 0	Counter12 0

Fig. D-31

In order to make the value in the master site can match with the value of PR site, so we will get value from the master site to do conversion.

Math value = (((Register value * (ScaleHi - ScaleLo)) / 4294967295) + ScaleLo)
 *In this sample, the ScaleLo value is set as "10", ScaleHi value is set as "30", please refer to **Fig.D-28**.

Now we are aware the value of Math1 at the PR is showing "100" and the value of input register at address 50 is showing "0"

We will take the value "0" into the expression as following:

$$\begin{aligned}
 \text{Math value} &= (((0 * (10000 - 100)) / 4294967295) + 100) \\
 &= ((0 / 4294967295) + 100) \\
 &= 100
 \end{aligned}$$

We got the value" 0" from the input register at address 50 in master site via above formula, the value "0" has been converted as "100".

iii.2.4 Modify expression value to "10" and check the Math1 value in "Overview" page

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Name: Math1
 Desc:
 Type: Math
 Log
 DataType: 4 Byte
 Value Range: -3.4E+38 ~ 3.4E+38
 Trigger: by Time
 Method: Instant
 Speed: 1 Sec/Dot
Expression: 10
 Scale
 Unit:
 Transformation: Value
 Table: Point 1 to 3
 Range: 100 ~ 10000

Back Copy

Fig. D-32

↑	AI41 321.1 °C	AI42 596.3 °F	AI43 253.5 °C	AI44 476.3 °F	AI45 888.8 °C
↑	AI46 1600.8 °F	AI47 53.34 %	AI48 52.50 %	Math1 1000	Math2 -712.6 °C
↓	Math3 -354.2	Math4 -248.7	Math5 -177.1	Math6 -19.5	Math7 132.3
↓	Math8 194.9	Math9 123.2	Math10 482.4	Math11 60.7	Math12 58.5
	Math13 56.4	Math14 54.3	Math15 52.1	Math16 39.3	Math17 41.4
	Math18 43.6	Math19 45.7	Math20 47.9	Counter1 0	Counter2 0
	Counter3 0	Counter4 0	Counter5 0	Counter6 0	Counter7 0
	Counter8 0	Counter9 0	Counter10 0	Counter11 0	Counter12 0

Fig. D-33

Now we are aware the value of Math1 at the PR is showing "1000" and the value of input register at address 50 is showing "390451572"

We will take the value "390451572" into the expression as following:

$$\text{Math value} = (((390451572 * (10000 - 100)) / 4294967295) + 100)$$

$$\begin{aligned}
 &= ((3865470562800/4294967295) + 100) \\
 &= 900 + 100 \\
 &= 1000
 \end{aligned}$$

We got the value "390451572" from the input register at address 50 in master site via above formula, the value "390451572" has been converted as "1000".

iii.2.5 Modify expression value to "15" and check the Math1 value in "Overview" page

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Name: Math1
 Desc:
 Type: Math
 Log
 DataType: 4 Byte
 Value Range: -3.4E+38 ~ 3.4E+38
 Trigger: by Time
 Method: Instant
 Speed: 1 Sec/Dot
Expression: 15
 Scale
 Unit:
 Transformation: Value
 Table: Point 1 to 3
 Range: 100 ~ 10000

Back Copy

Fig. D-34

↑	AI41 321.1 °C	AI42 596.3 °F	AI43 253.5 °C	AI44 476.3 °F	AI45 888.8 °C
↑	AI46 1600.8 °F	AI47 53.34 %	AI48 52.50 %	Math1 1.00E4	Math2 -139.4 °C
↓	Math3 -143.3	Math4 35.9	Math5 267.0	Math6 340.0	Math7 419.8
↓	Math8 424.8	Math9 212.6	Math10 566.5	Math11 60.7	Math12 58.5
	Math13 56.4	Math14 54.3	Math15 52.1	Math16 39.3	Math17 41.4
	Math18 43.6	Math19 45.7	Math20 47.9	Counter1 0	Counter2 0
	Counter3 0	Counter4 0	Counter5 0	Counter6 0	Counter7 0
	Counter8 0	Counter9 0	Counter10 0	Counter11 0	Counter12 0

Fig. D-35

Now we are aware the value of Math1 at the PR is showing "10000" and the value of input register at address 50 is showing "4294967295"

We will take the value "4294967295" into the expression as following:

$$\begin{aligned}\text{Math value} &= (((4294967295 * (10000 - 100)) / 4294967295) + 100) \\ &= ((42520176220500/4294967295) + 9900) \\ &= 9900 + 100 \\ &= 10000\end{aligned}$$

We got the value "4294967295" from the input register at address 50 in master site via above formula the value "4294967295" has been converted as "10000".

iii.3 Transformation : Math Channel

iii.3.1 Change the transformation type to "Math Channel"

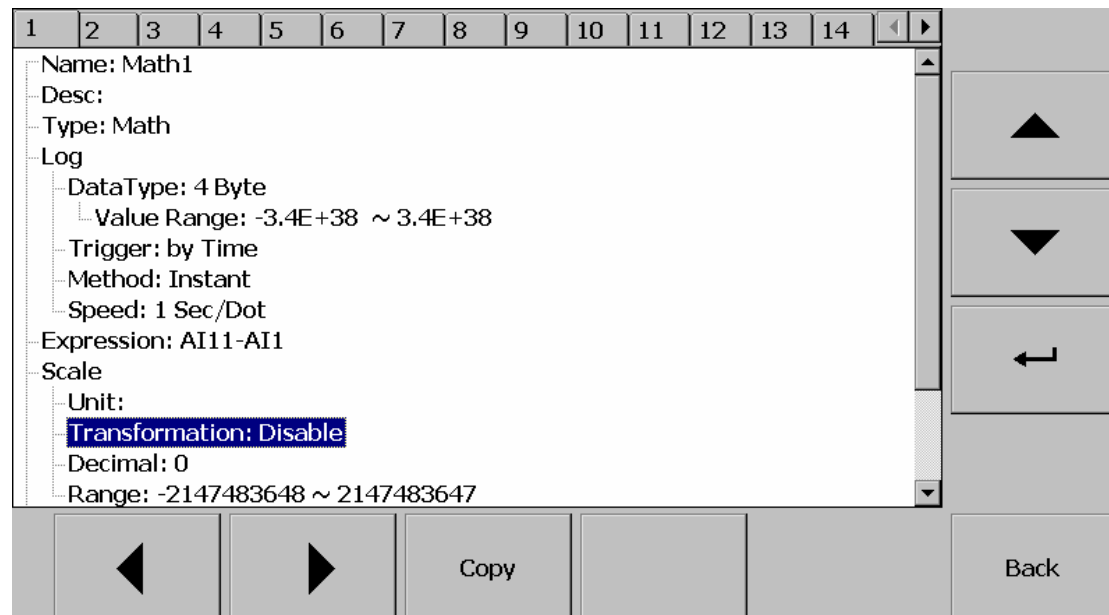


Fig. D-36

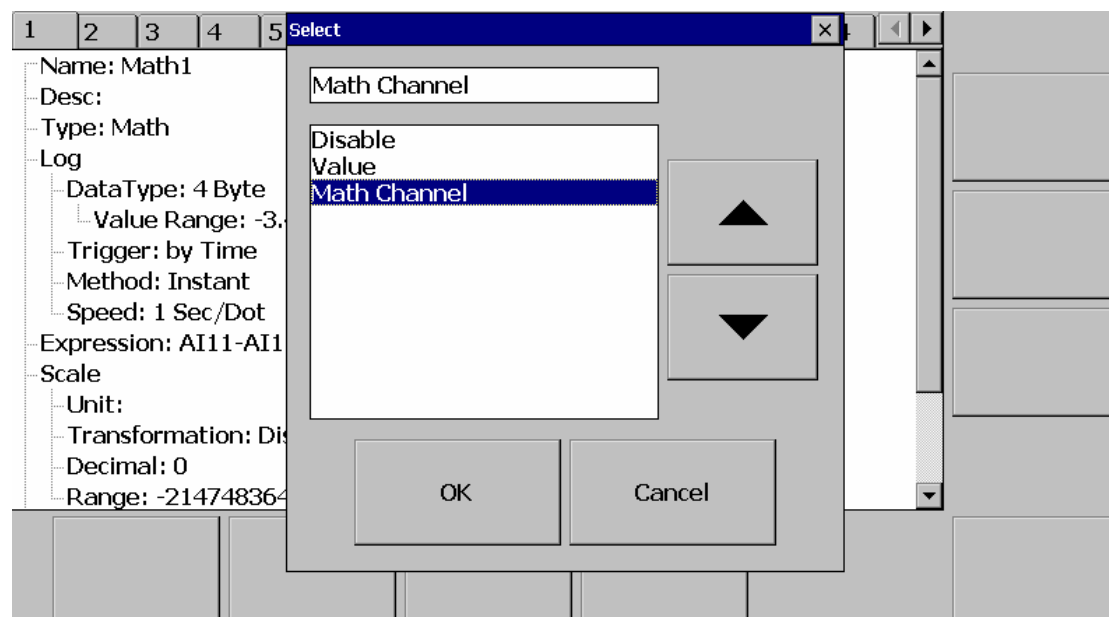


Fig. D-37

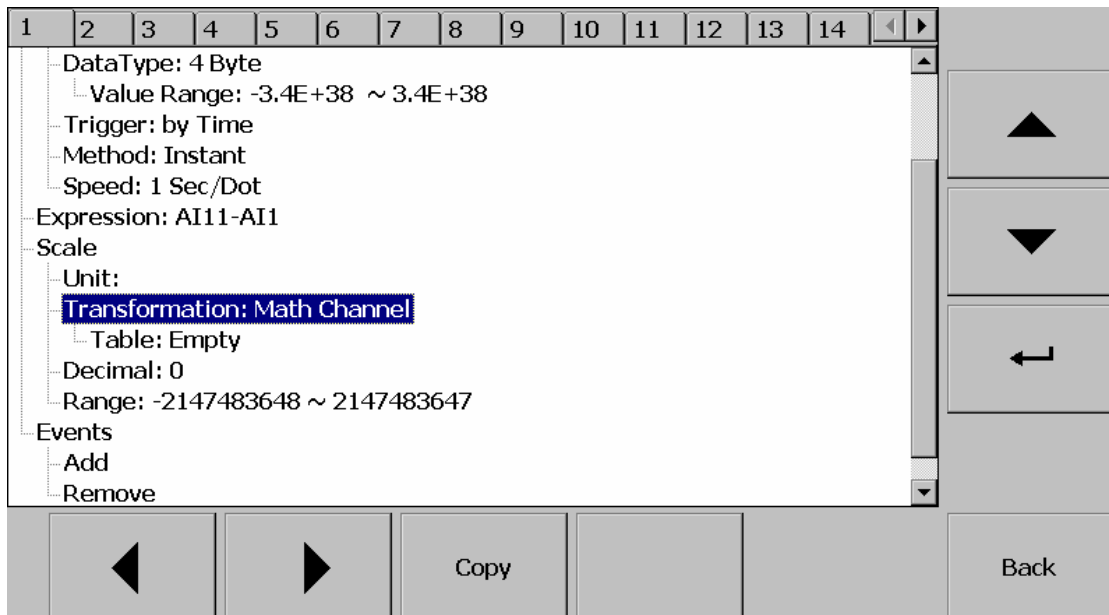


Fig. D-38

iii.3.2 Create scale range table for conversion

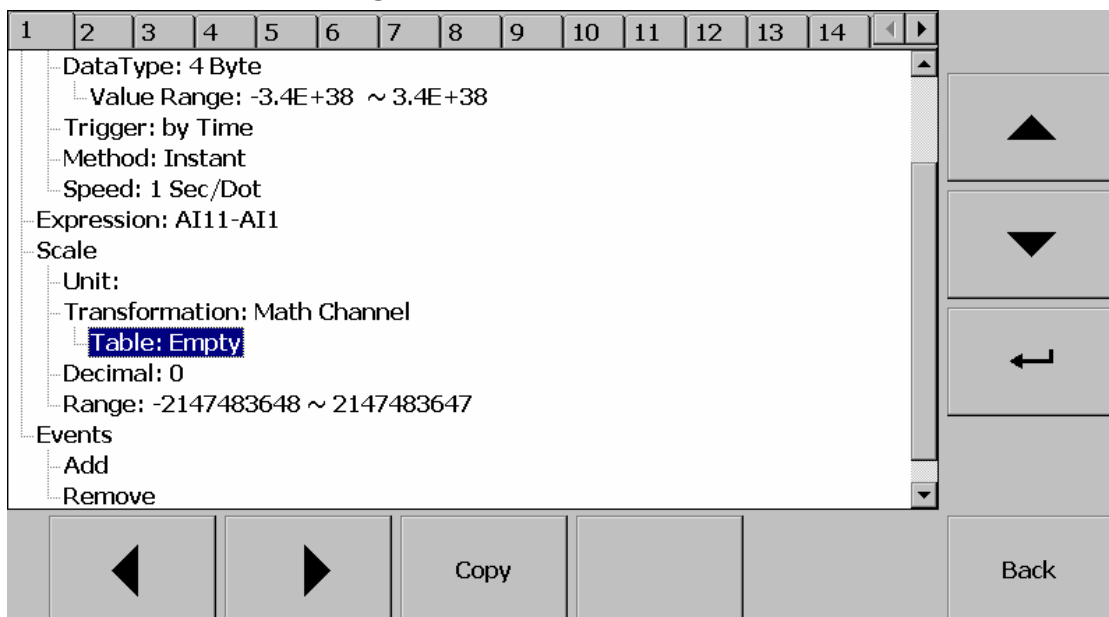


Fig. D-39

Press "Add" button to add scale range

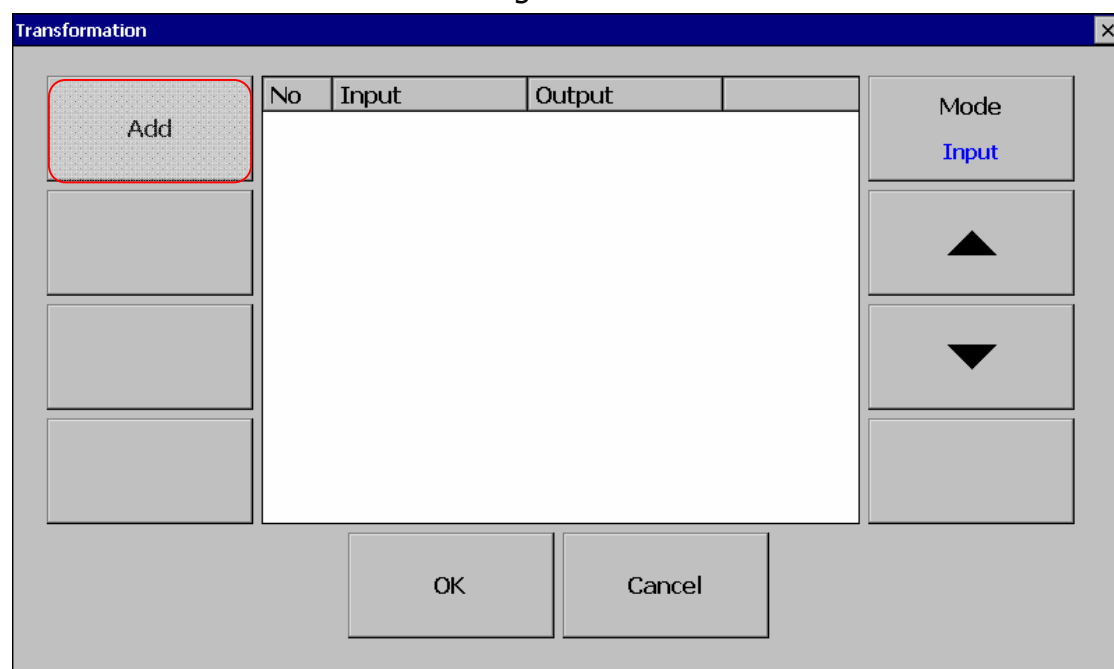


Fig. D-40

Press "Enter" button to modify "Input" value

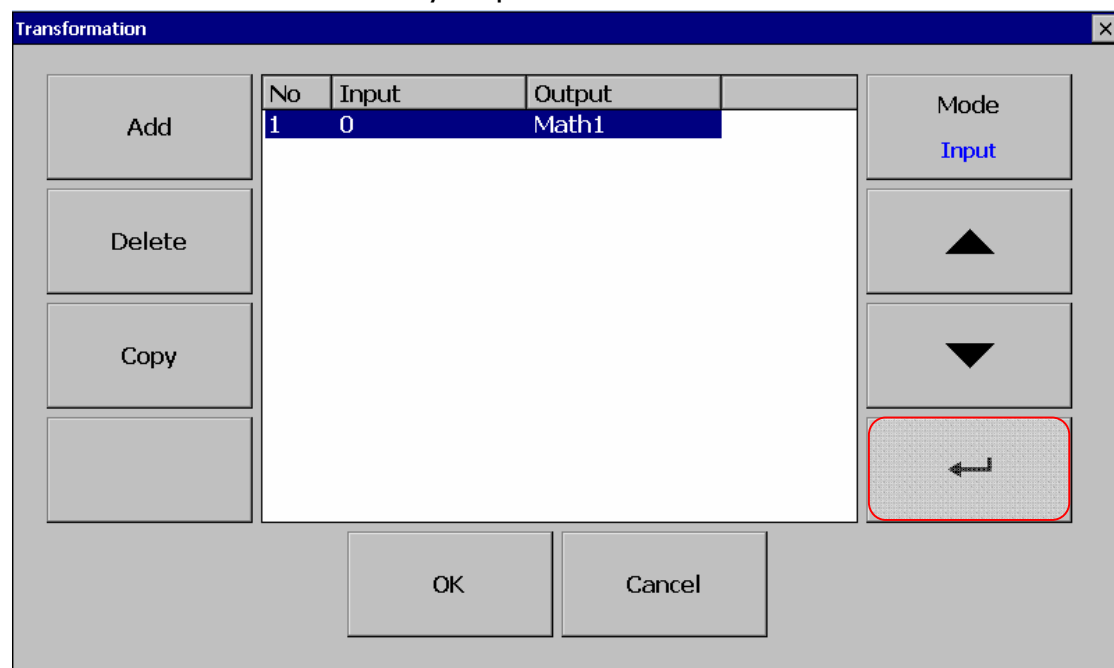


Fig. D-41

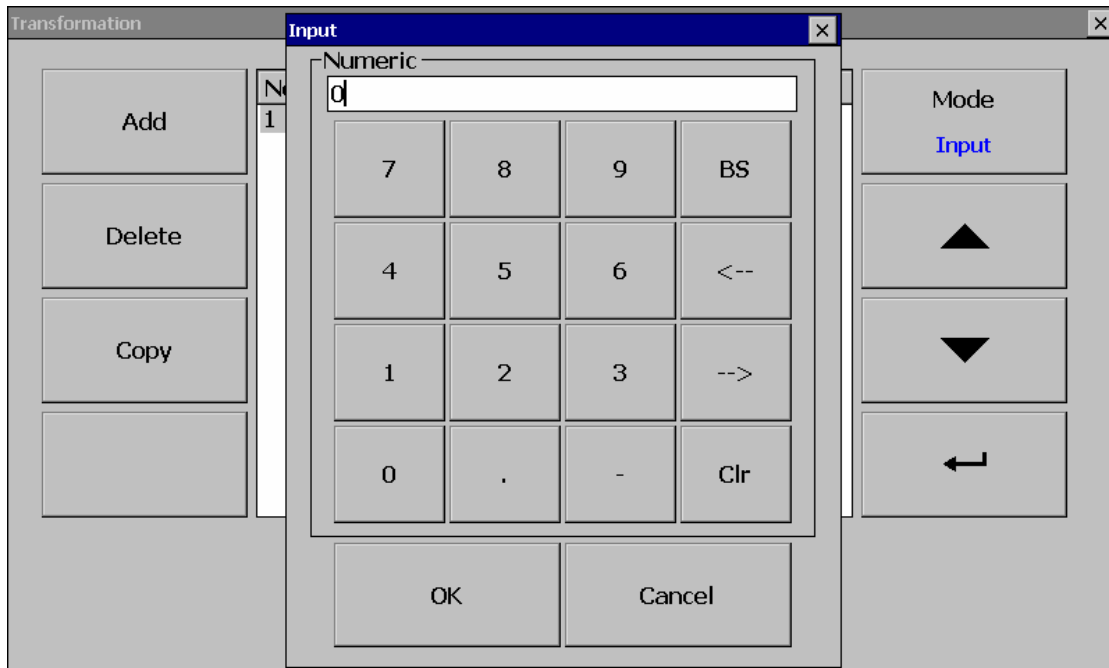


Fig. D-42

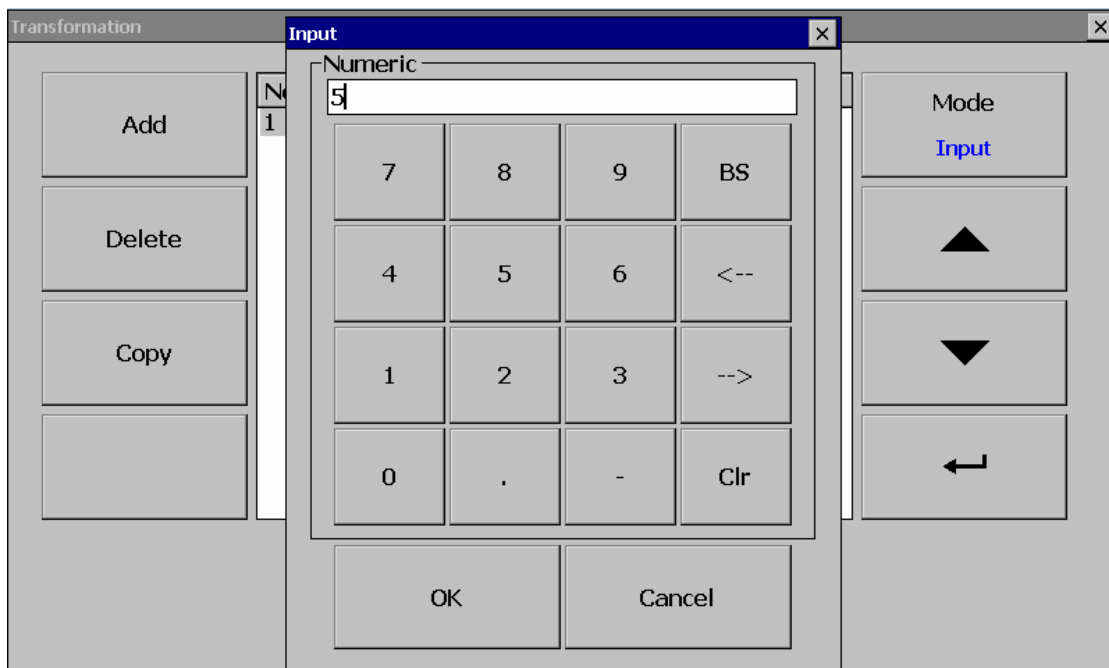


Fig. D-43

Press "Mode" button from "Input" to "Output"

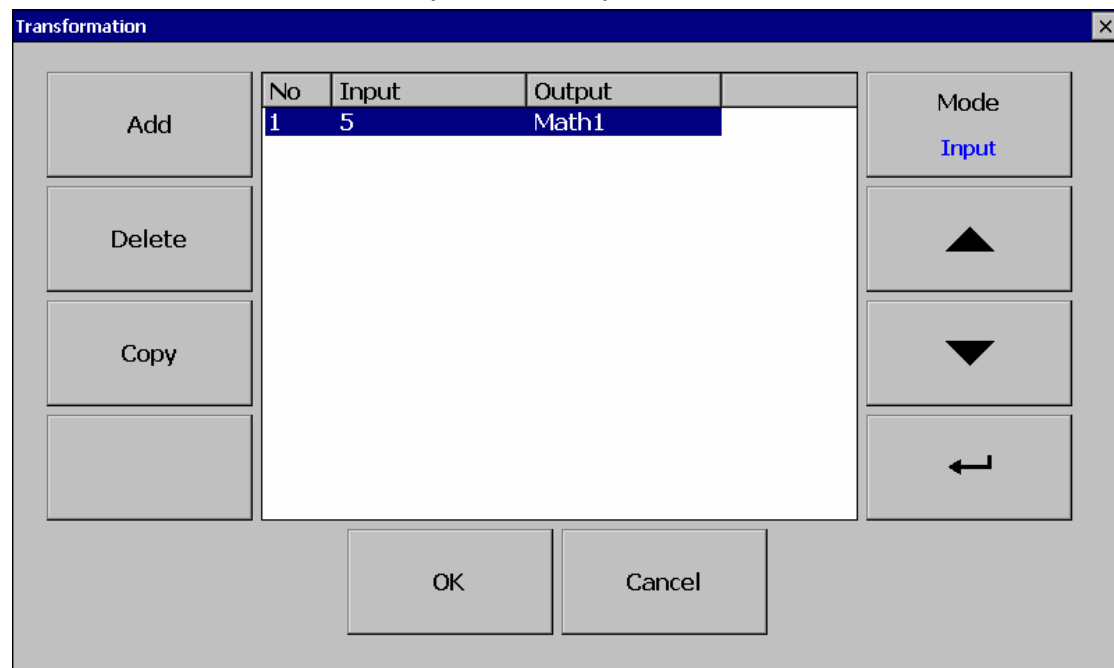


Fig. D-44

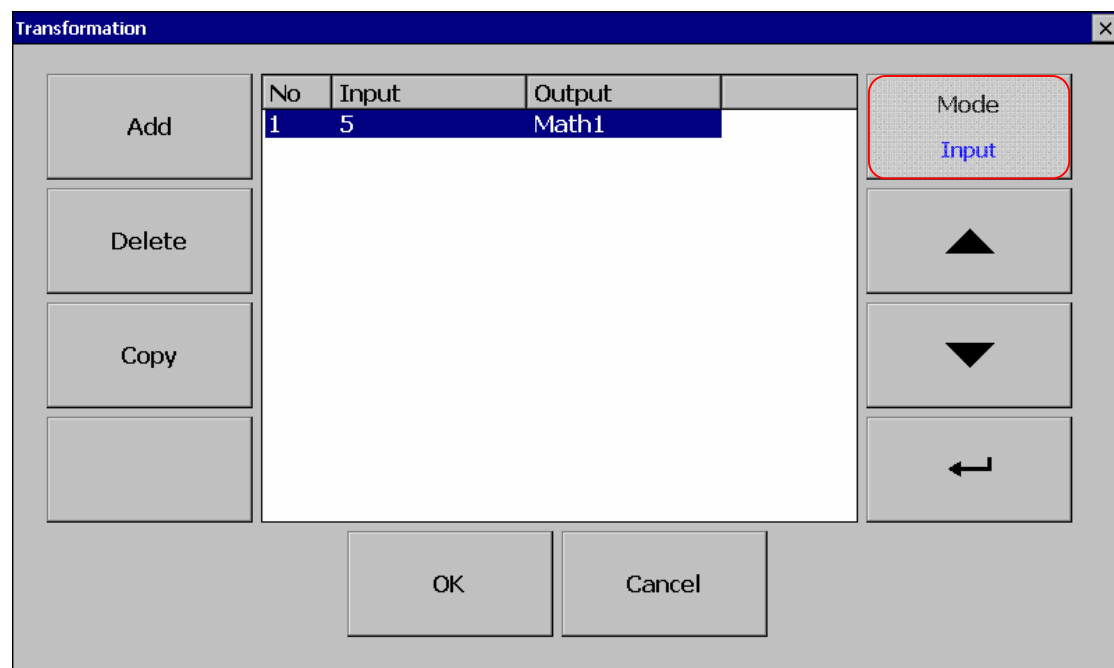


Fig. D-45



Fig. D-46

Press "Enter" button to modify "Output" value

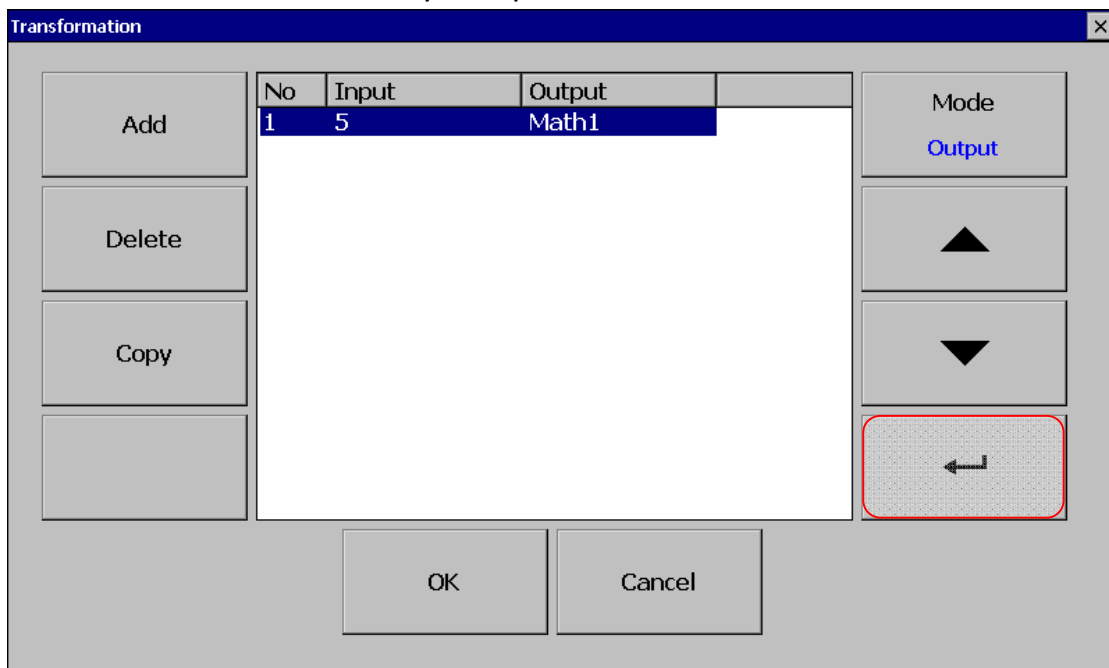


Fig. D-47

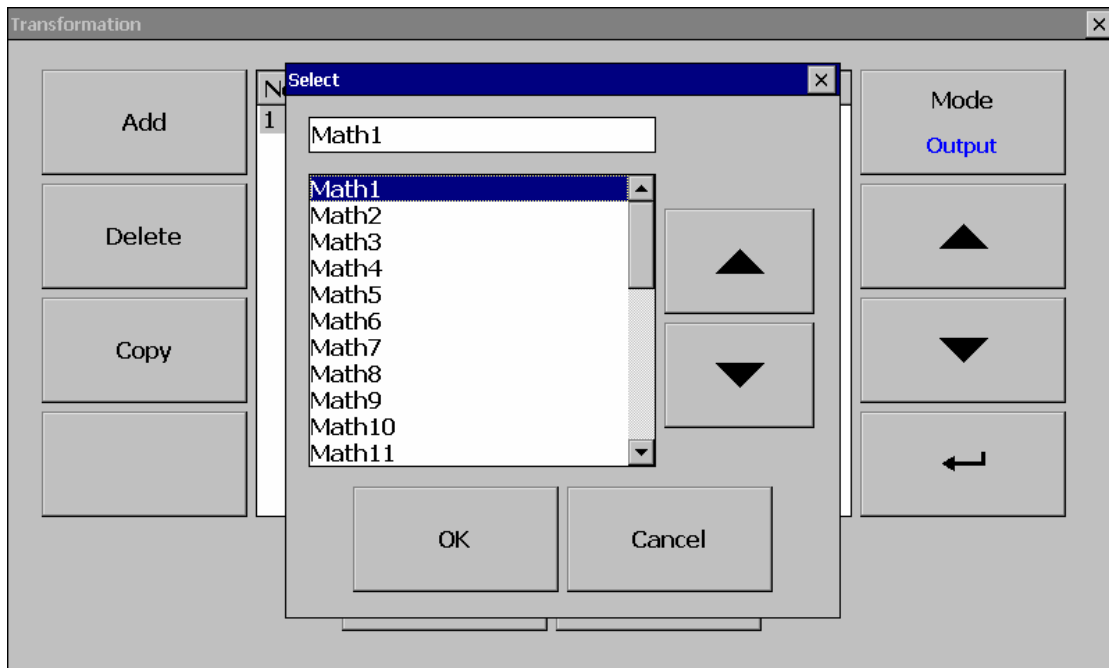


Fig. D-48

Press select output channel is "Math2"

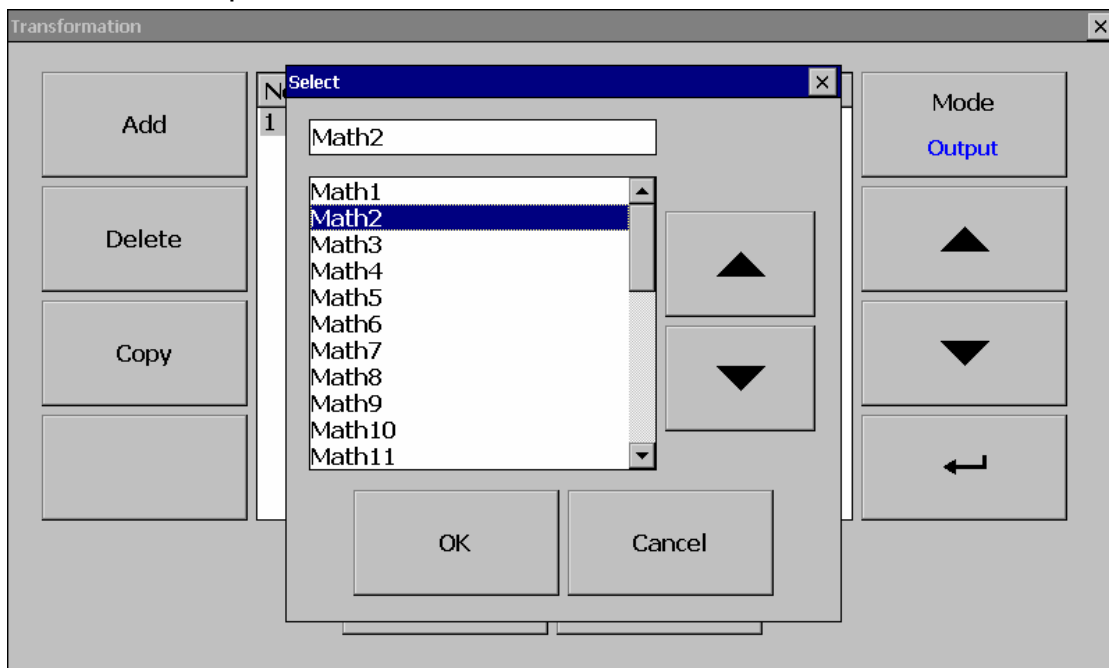


Fig. D-49

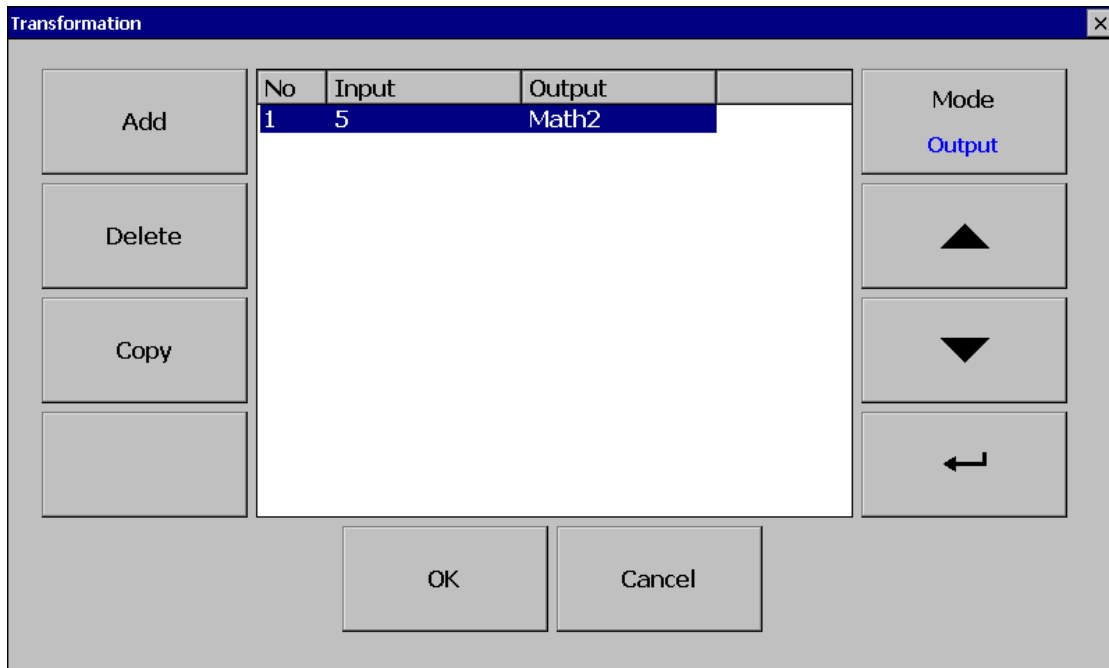


Fig. D-50

Please repeat **Fig. D-40** to **Fig D-50** to add another scale range.

In here, we use 3 points to do conversion for this sample, so please set output channel as "Math2", "Math3" and "Math4".

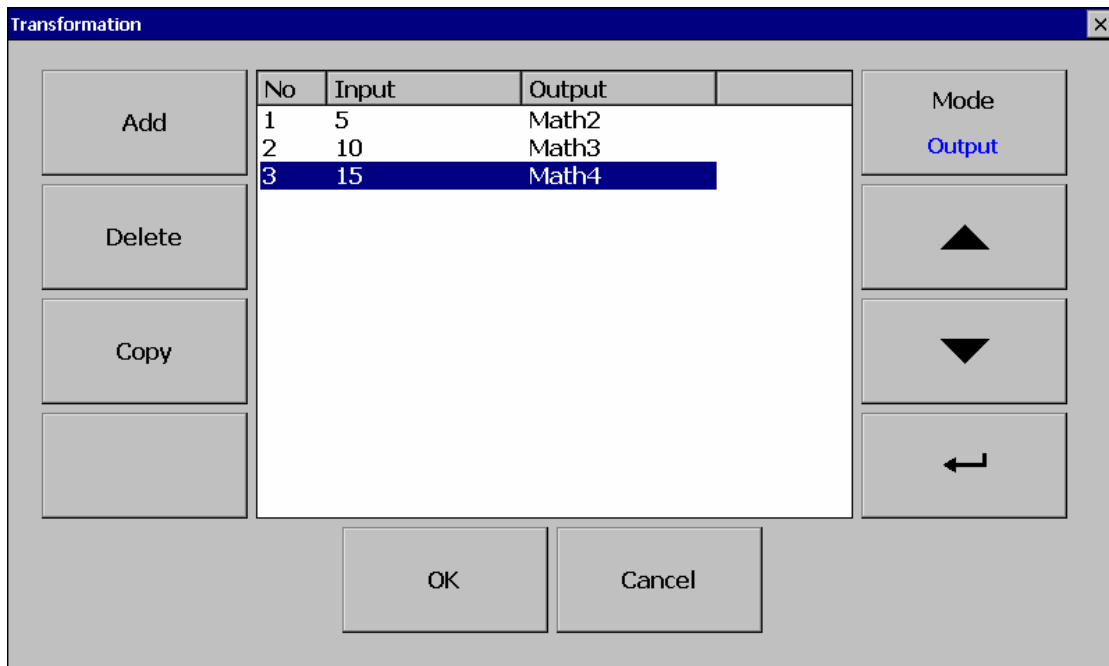


Fig. D-51

iii.3.3 Modify the content of expression in Math2 to "5"

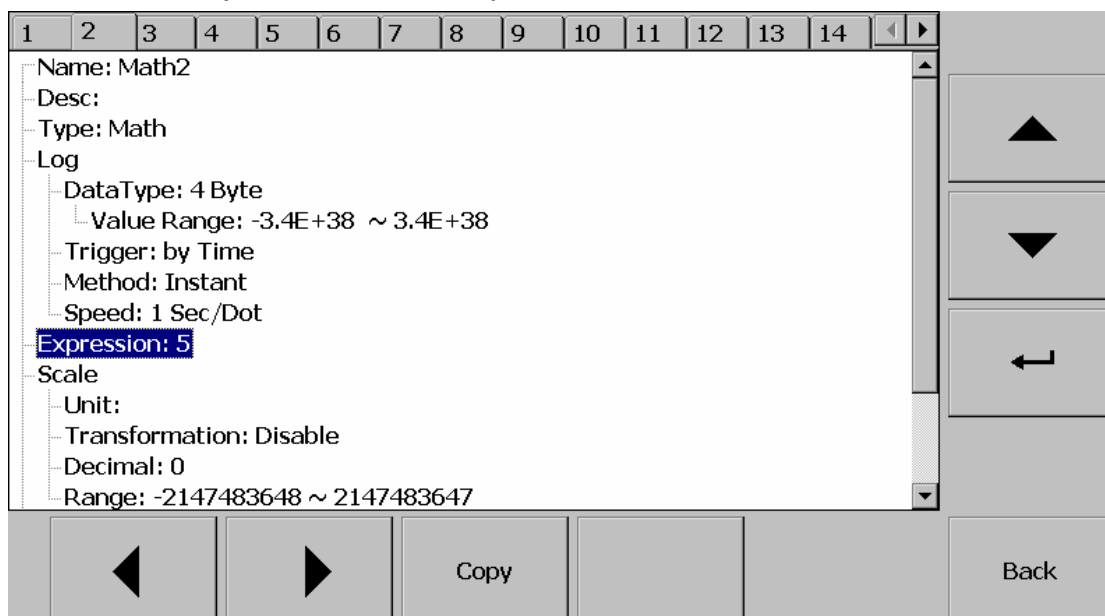


Fig. D-52

iii.3.4 Create the table of scale range in Math2

*Note: Create the table of scale range for step, please refer to **Fig. D-17** to **Fig. D-28** step.

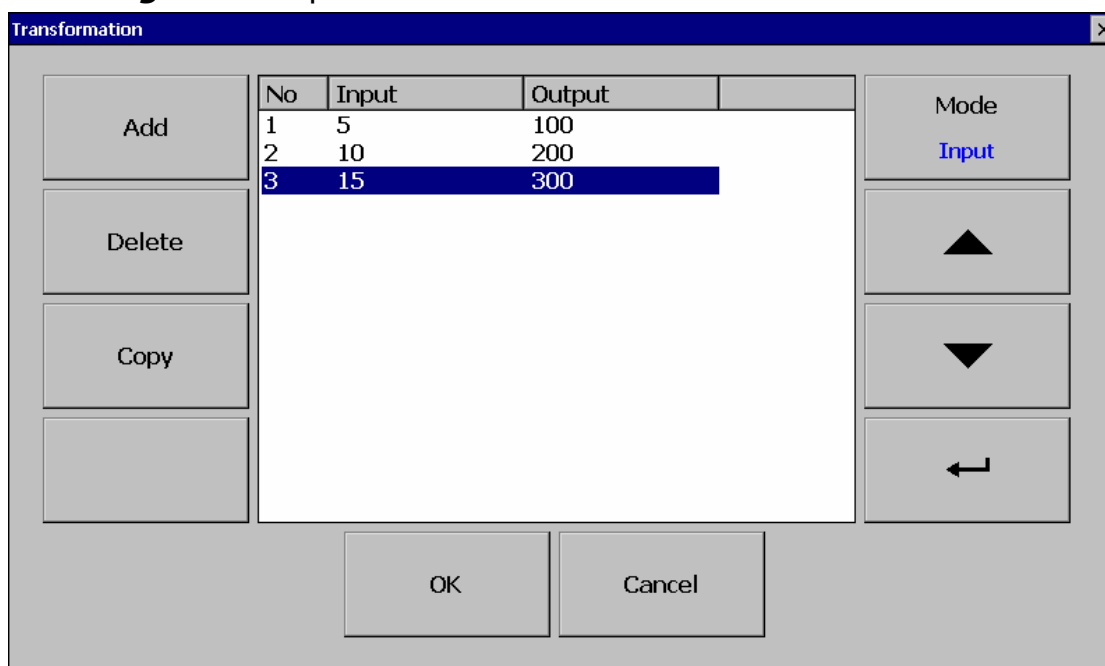


Fig. D-53

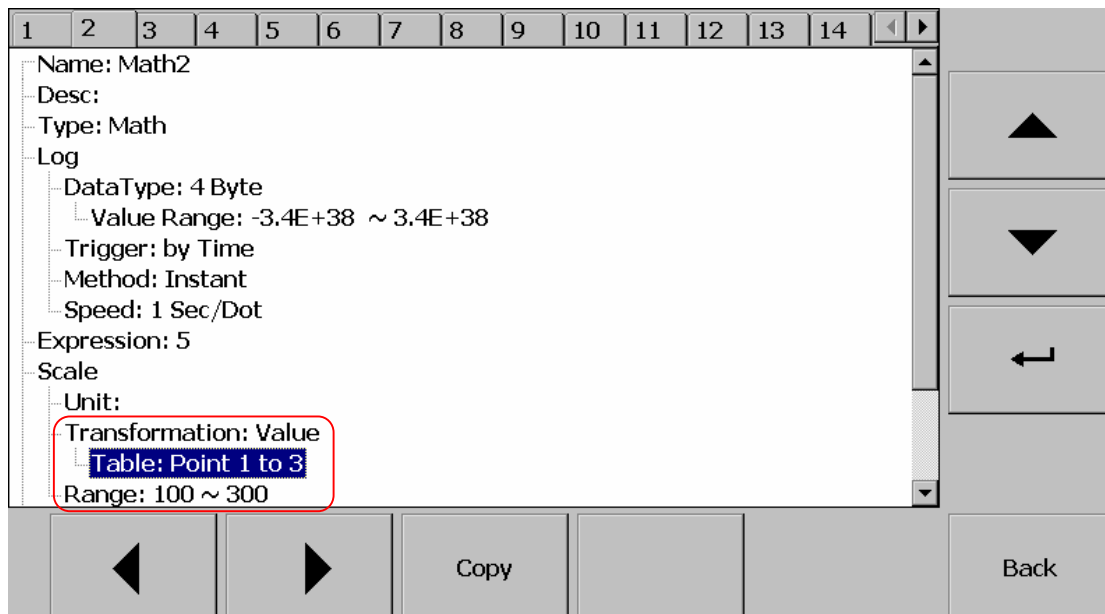


Fig. D-54

iii.3.5 Modify the content of expression in Math3 to "10"

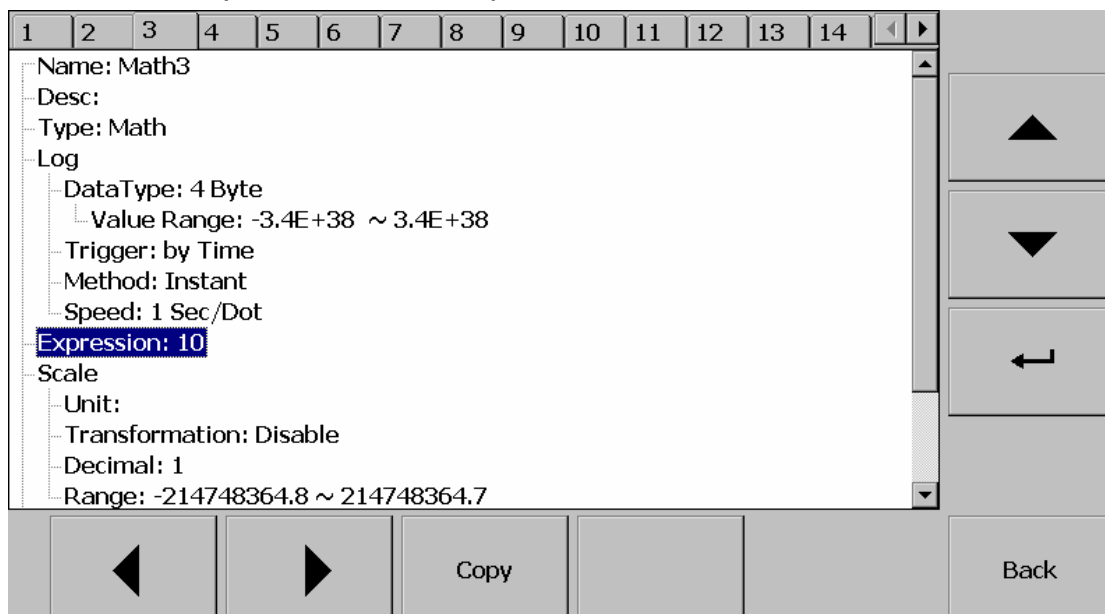


Fig. D-55

iii.3.6 Create table of scale range in Math3

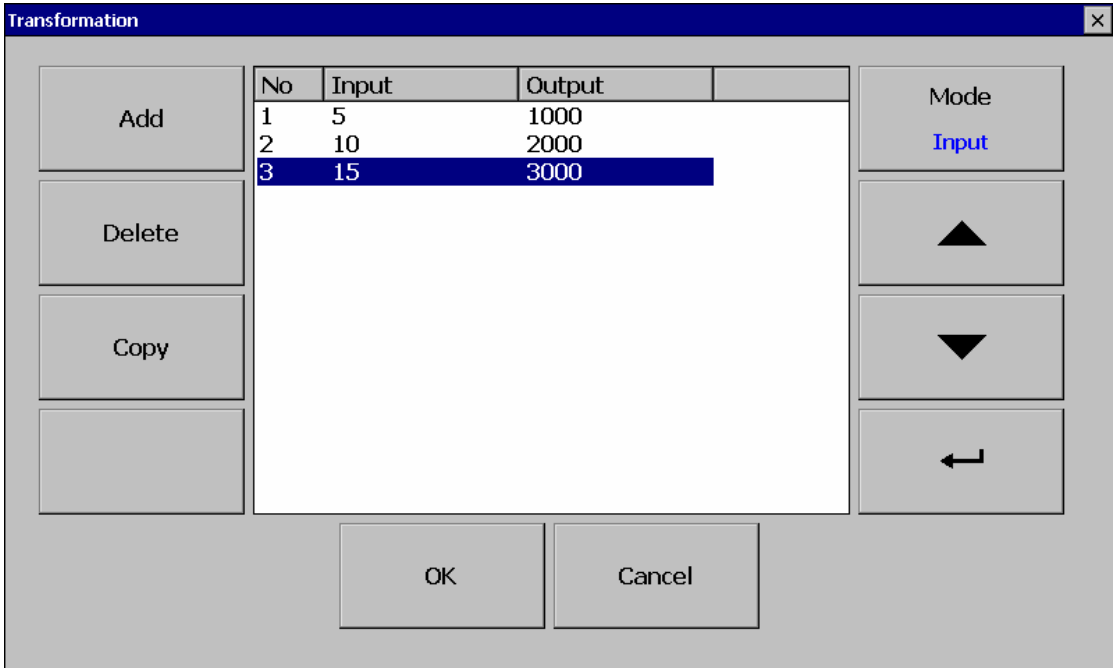


Fig. D-56

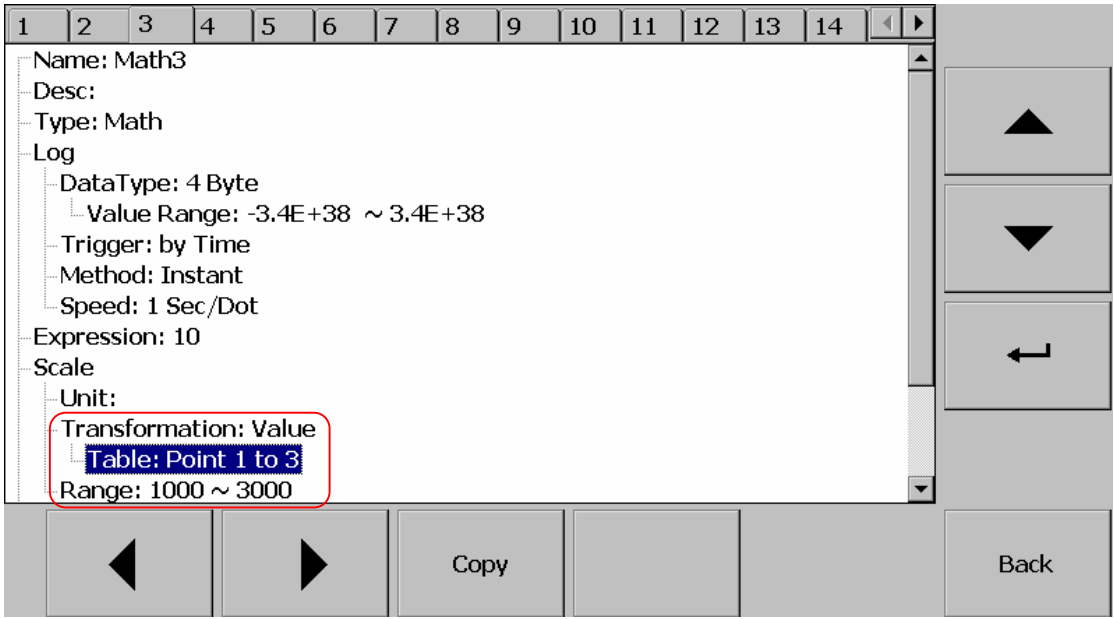


Fig. D-57

iii.3.7 Modify the content of expression in Math4 to "15"

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Name: Math4
 Desc:
 Type: Math
 Log
 DataType: 4 Byte
 Value Range: -3.4E+38 ~ 3.4E+38
 Trigger: by Time
 Method: Instant
 Speed: 1 Sec/Dot
 Expression: 15
 Scale
 Unit:
 Transformation: Disable
 Decimal: 1
 Range: -214748364.8 ~ 214748364.7

Back

Fig. D-58

iii.3.8 Create table of scale range in Math4

Transformation

No	Input	Output
1	5	10000
2	10	20000
3	15	30000

Mode
Input

OK Cancel

Fig. D-59

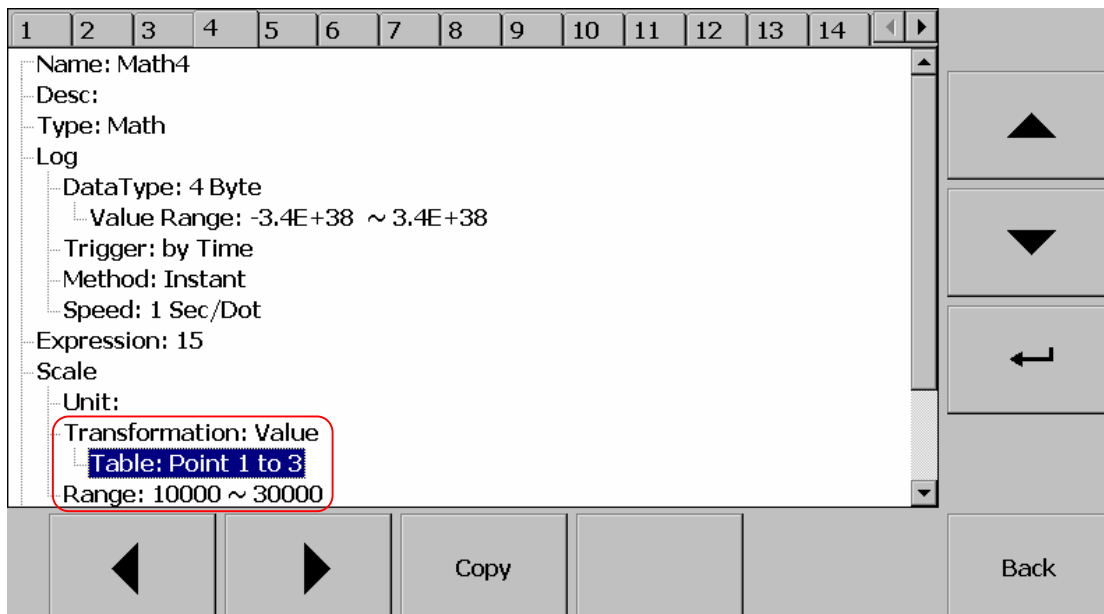


Fig. D-60

iii.3.9 Modify the content of expression in Math1 to "5"

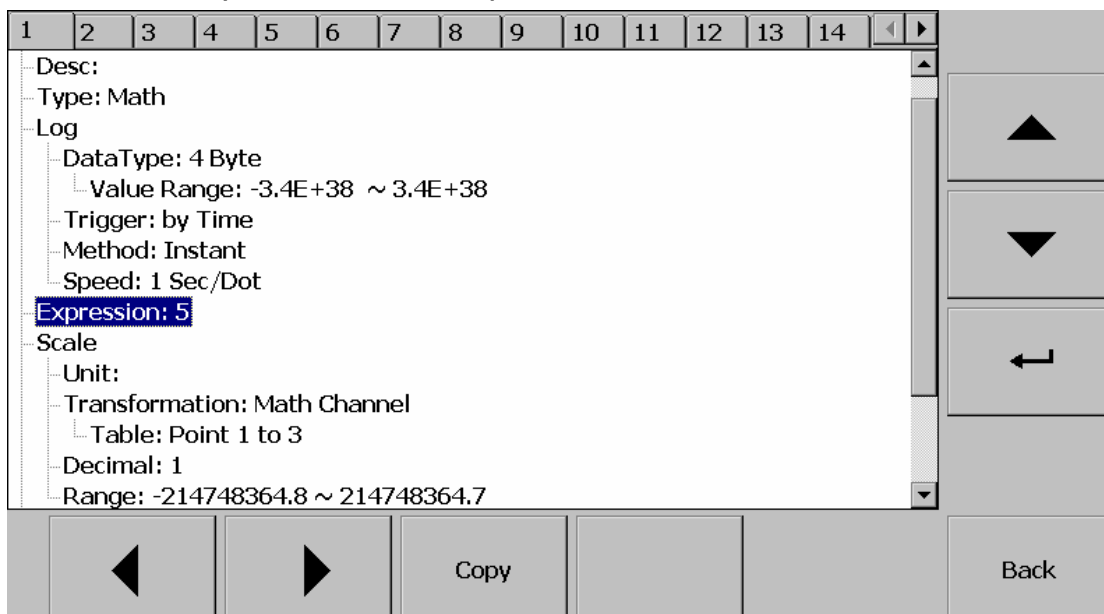


Fig. D-61

iii.3.10 Modify decimal value to "0"

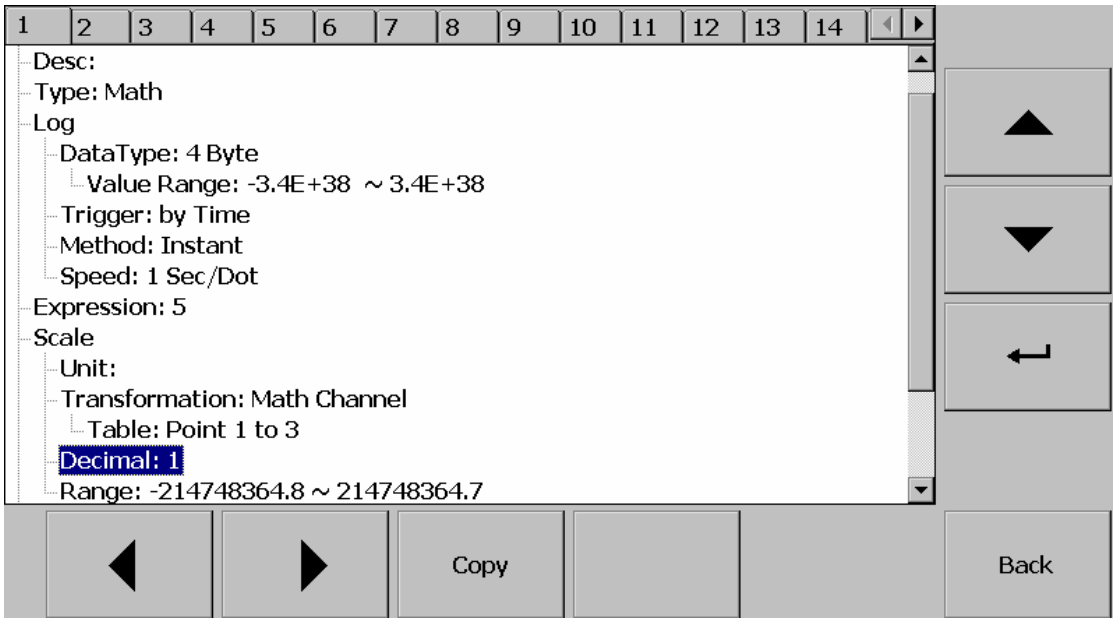


Fig. D-62

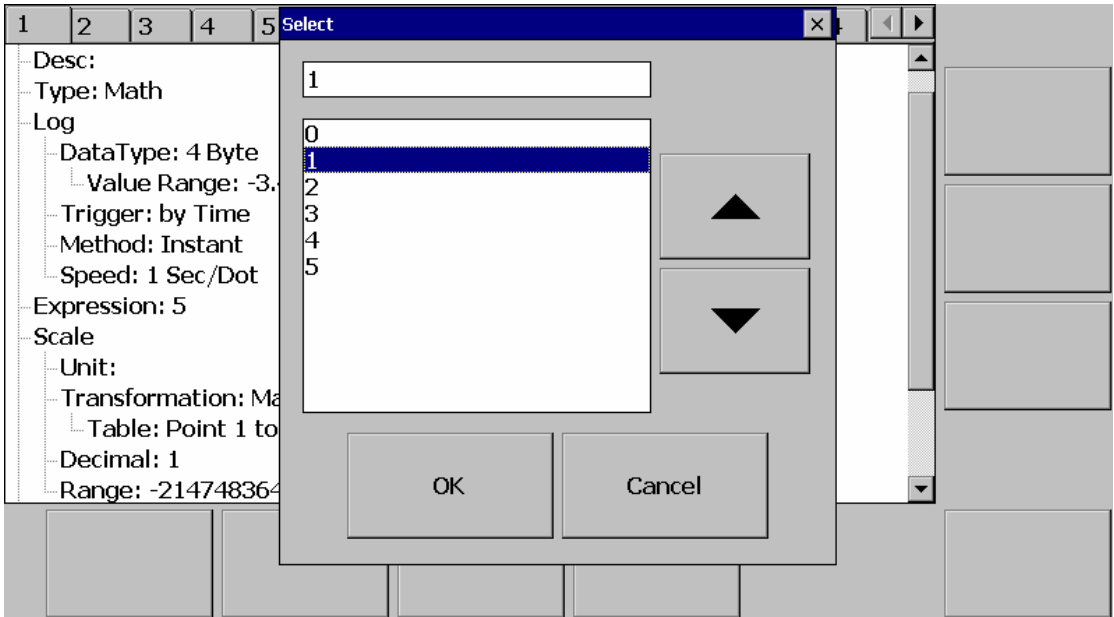


Fig. D-63

Please select "0"

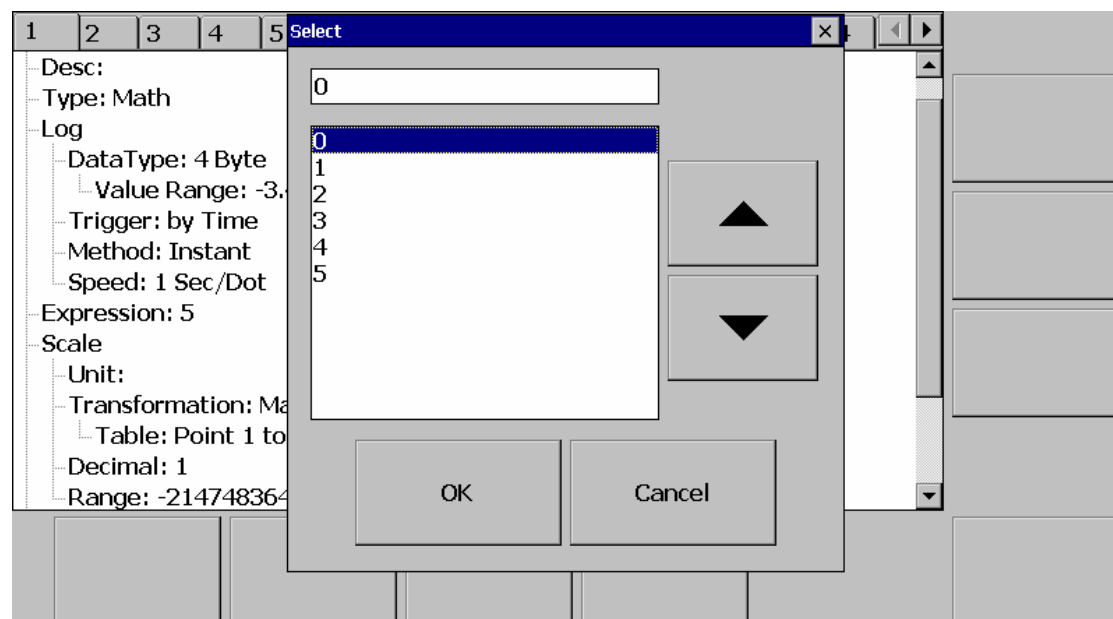


Fig. D-64

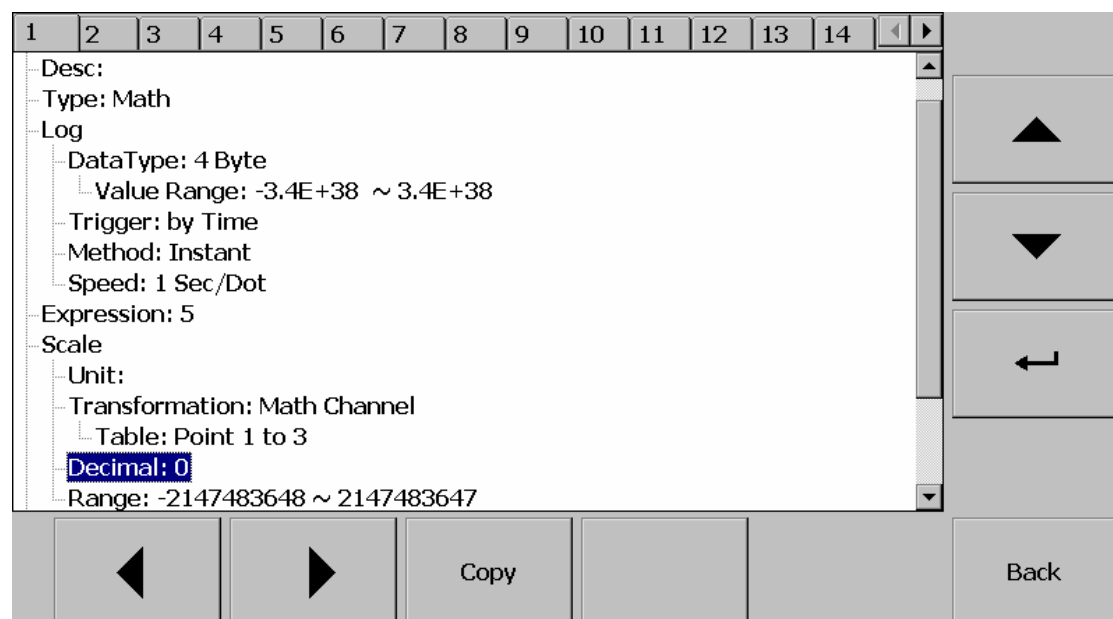


Fig. D-65

iii.3.11 Check the Math1 value in "Overview" page

Menu	Realtime		Overview		mem 85%	04:58:54 06/07/13
↑	AI41 177.3 °C	AI42 362.2 °F	AI43 151.9 °C	AI44 316.2 °F	AI45 691.7 °C	
↑	AI46 1305.0 °F	AI47 46.99 %	AI48 47.70 %	Math1 100	Math2 100	
↓	Math3 2000	Math4 3.00E4	Math5 1730.3	Math6 1524.5	Math7 1367.4	
↓	Math8 1093.9	Math9 507.4	Math10 844.0	Math11 51.9	Math12 53.9	
	Math13 55.8	Math14 57.8	Math15 59.7	Math16 59.7	Math17 57.8	
	Math18 55.8	Math19 53.9	Math20 52.0	Counter1 0	Counter2 0	
	Counter3 0	Counter4 0	Counter5 0	Counter6 0	Counter7 0	
	Counter8 0	Counter9 0	Counter10 0	Counter11 0	Counter12 0	

Fig. D-66

If the decimal value in Math1 is set as "0", we don't need to do conversion. Because the value of PR site in Math1 is the same as the value at input register address 50 in master site.

If the decimal value of Math1 is not set as "0", please refer to Page 30 Step2 to do conversion.

Base on the table of conversion in Math1, the input value "5" is converted to output "Math2", so the result of output value in Math1 will refer to Math2's operation result.

Now we are aware Math2's input value "5" is converted output "100", so Math2's output value "100" will be taken into the Math1 as Math1's output result.

In above "Overview" page, we can see the Math1 value is showing "100".

iii.3.12 Modify content of expression in Math1 to "10" and check the Math1 value in "Overview" page

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Name: Math1 Desc: Type: Math Log DataType: 4 Byte Value Range: -3.4E+38 ~ 3.4E+38 Trigger: by Time Method: Instant Speed: 1 Sec/Dot Expression: 10 Scale Unit: Transformation: Math Channel Table: Point 1 to 3 Decimal: 0													
<div> <div>◀</div> <div>▶</div> <div>Copy</div> <div>Back</div> </div>													

Fig. D-67

Menu	Realtime				Overview	mem	05:00:58
	AI41	AI42	AI43	AI44	AI45	85%	06/07/13
↑	-168.8 °C	-197.3 °F	-91.0 °C	-66.3 °F	220.2 °C		
↑	AI46	AI47	AI48	Math1	Math2		
	597.8 °F	31.81 %	36.30 %	2000	100		
↓	Math3	Math4	Math5	Math6	Math7		
	2000	3.00E4	987.0	922.8	886.1		
↓	Math8	Math9	Math10	Math11	Math12		
	713.8	357.7	703.0	60.0	70.0		
	Math13	Math14	Math15	Math16	Math17		
	80.0	90.0	100.0	90.0	80.0		
	Math18	Math19	Math20	Counter1	Counter2		
	70.0	60.0	50.0	0	0		
	Counter3	Counter4	Counter5	Counter6	Counter7		
	0	0	0	0	0		
	Counter8	Counter9	Counter10	Counter11	Counter12		
	0	0	0	0	0		

Fig. D-68

Base on the table of conversion in Math1, the input value "10" is converted to output "Math3", so the result of output value in Math1 will refer to Math3's operation result.

Now we are aware Math3's input value "10" is converted output "2000", so Math3's output value "2000" will be taken into the Math1 as Math1's output result.

In above "Overview" page, we can see the Math1 value is showing "2000".

iii.3.13 Modify the content of expression in Math1 to "15" and check the Math1 value in "Overview" page

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Name: Math1
 Desc:
 Type: Math
 Log
 DataType: 4 Byte
 Value Range: -3.4E+38 ~ 3.4E+38
 Trigger: by Time
 Method: Instant
 Speed: 1 Sec/Dot
Expression: 15
 Scale
 Unit:
 Transformation: Math Channel
 Table: Point 1 to 3
 Decimal: 0

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Fig. D-69

↑	AI41 391.7 °C	AI42 710.6 °F	AI43 303.1 °C	AI44 554.5 °F	AI45 985.2 °C
↑	AI46 1745.3 °F	AI47 56.44 %	AI48 54.80 %	Math1 3.00E4	Math2 100
↓	Math3 2000	Math4 3.00E4	Math5 -193.4	Math6 -32.6	Math7 121.8
↓	Math8 183.4	Math9 119.9	Math10 479.3	Math11 71.0	Math12 66.8
	Math13 62.6	Math14 58.4	Math15 54.2	Math16 29.0	Math17 33.2
	Math18 38.1	Math19 42.1	Math20 46.0	Counter1 0	Counter2 0
	Counter3 0	Counter4 0	Counter5 0	Counter6 0	Counter7 0
	Counter8 0	Counter9 0	Counter10 0	Counter11 0	Counter12 0

Fig. D-70

Base on the table of conversion in Math1, the input value "15" is converted to output "Math4", so the result of output value in Math1 will refer to Math4's operation result.

Now we are aware Math4's input value "15" is converted output "30000", so Math4's output value "30000" will be taked into the Math1 as Math1's output result.

In above "Overview" page, we can see the Math1 value is showing "30000".

Appendix E

AO Convert Example

i. Press 『Menu』 -> 『More』 -> 『Config』

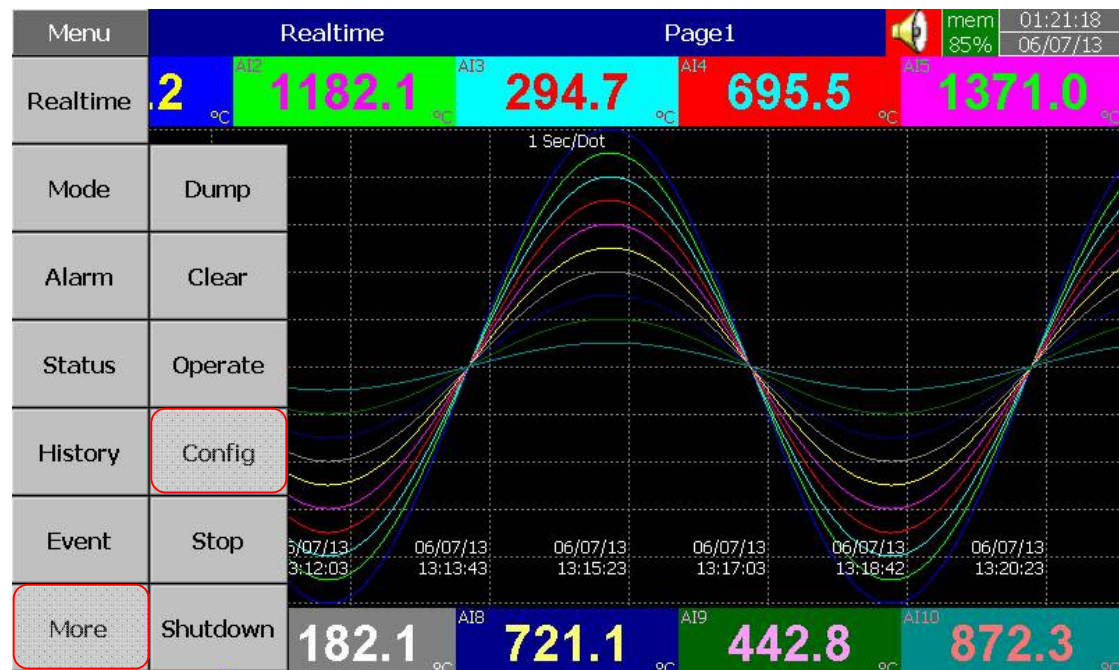


Fig. E-1

ii. Please select 『AO』

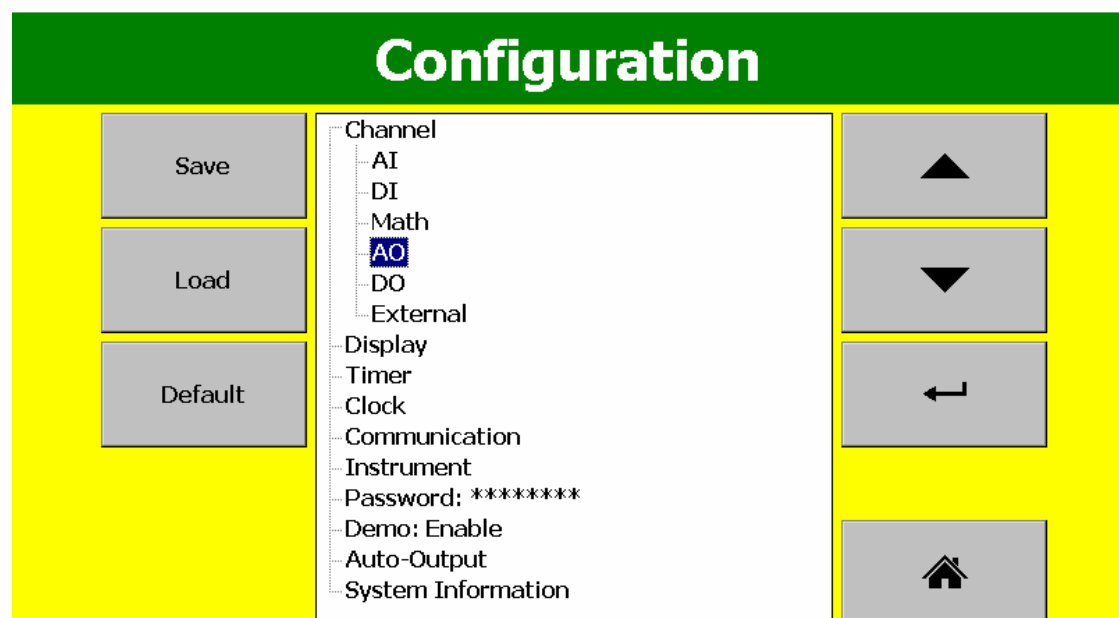


Fig. E-2

iii. We can see the expression of AO in following screen

1

Desc:

Type: Current

Output: 4-20mA

Expression: $4+(20-4)*(AI1-(-120))/(1000-(-120))$

Navigation buttons: Up, Down, Enter, Left, Right, Copy, Back

Fig. E-3

Please change the content of expression from AI1 to 10 as following showing

1

Desc:

Type: Current

Output: 4-20mA

Expression: $4+(20-4)*(10-(-120))/(1000-(-120))$

Navigation buttons: Up, Down, Enter, Left, Right, Copy, Back

Fig. E-4

iv. Please come back to the main screen and press 『Menu』 -> 『Status』

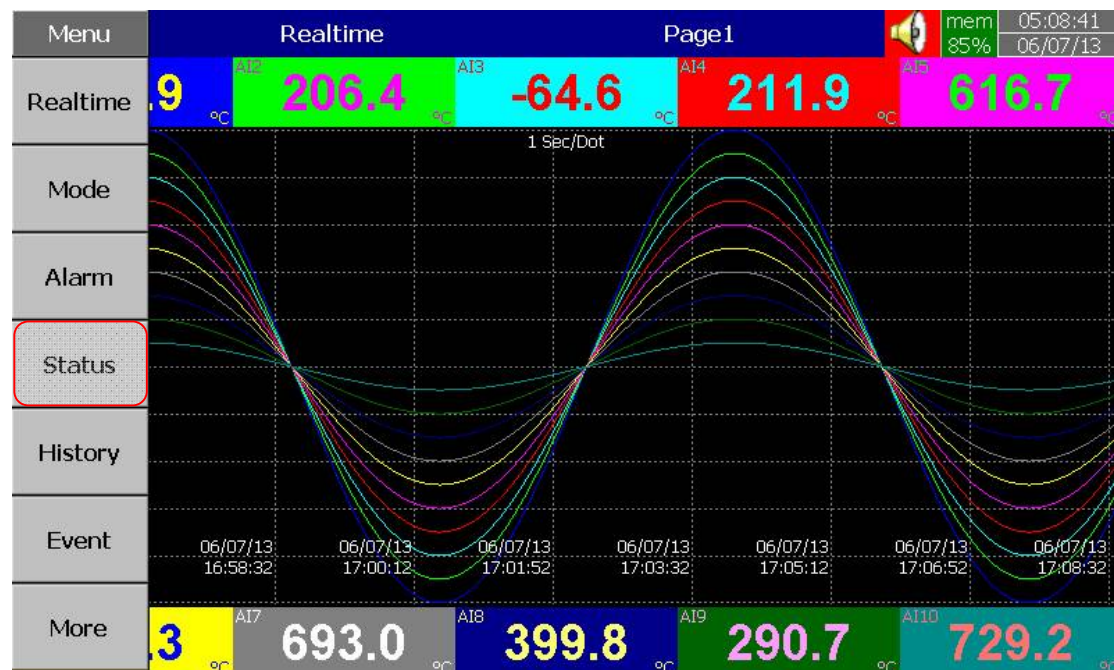


Fig. E-5

v. Press 『AO』 page as following showing

DI	DO	AO	Counter	Totalizer	
No.	Name		Value	Description	
1	AO1		5.857		
2	AO2		6.033		
3	AO3		6.698		
4	AO4		7.358		
5	AO5		8.021		
6	AO6		8.684		
7	AO7		9.347		
8	AO8		10.010		
9	AO9		10.673		
10	AO10		11.337		
11	AO11		8.975		
12	AO12		9.278		

Fig. E-6

In here we can see the value is showing "5.857", but at the Input Register address 601 is showing "38625", so we need using specific expression to convert the value as following:

$$\text{AO value} = (((\text{Register value} * 65.535) / 65535) - 32.768)$$

Now the Register value is "38625", please take the value "38625" into the expression as following:

$$\begin{aligned}\text{AO value} &= (((38625 * 65.535) / 65535) - 32.768) \\ &= ((2531289.375 / 65535) - 32.768) \\ &= 38.625 - 32.768 \\ &= 5.857\end{aligned}$$

Appendix F

Ext Convert Example for AI

i. Press 『Menu』 -> 『More』 -> 『Config』

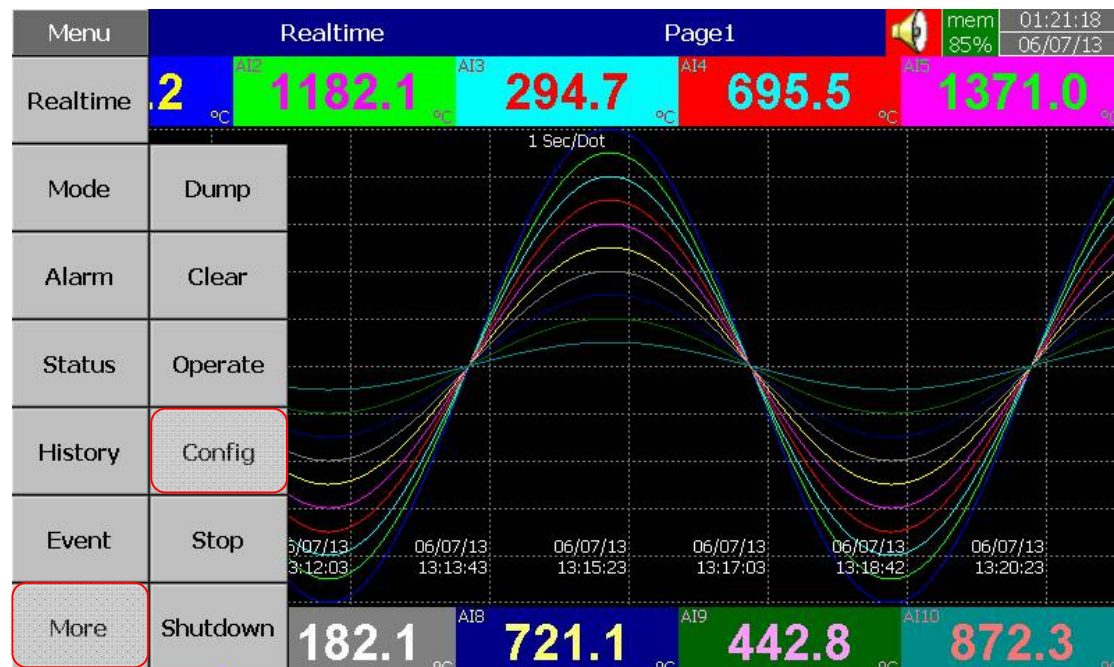


Fig. F-1

ii. Please select 『External』

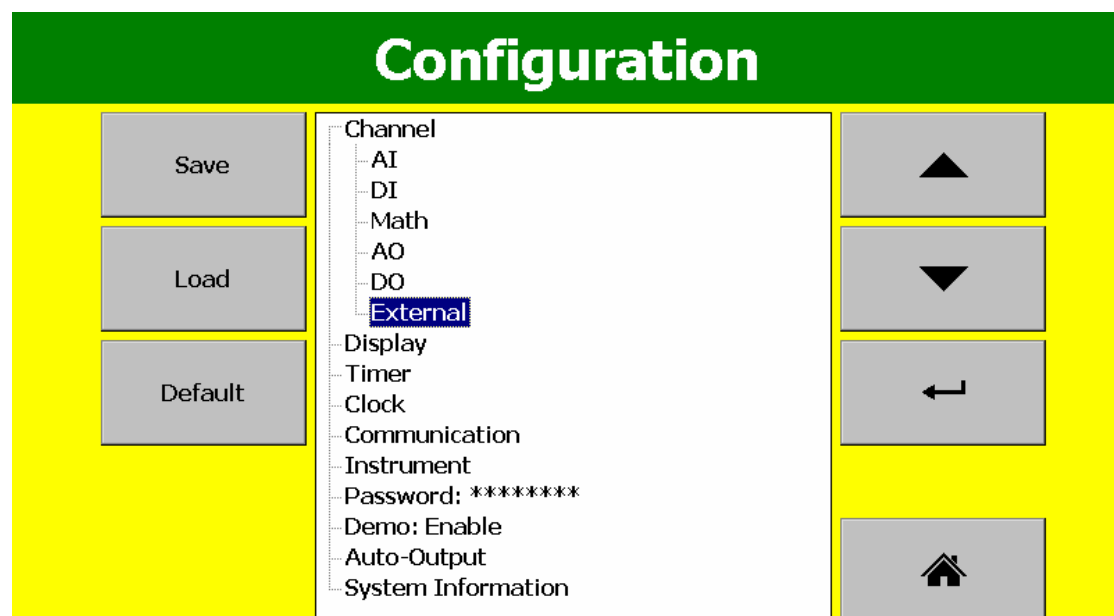


Fig. F-2

iii. Please modify the 『DataType』 from 『4 Byte』 to 『2 Byte』

1 2 3 4 5 6 7 8 9 10 11 12 13 14

- Value Range: -32768 ~ 32767
- Trigger: by Time
- Method: Instant
- Speed: 1 Sec/Dot
- Modbus Register Value(MV) Conversion
 - DataType: 4 Byte**
 - Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$
 - Range
 - Low(RL): 0.0
 - High(RH): 4294967295.0
 - Scale
 - Unit:
 - Low(SL): 0.0
 - High(SH): 4294967295.0
- Events

Navigation buttons: Left arrow, Right arrow, Copy, Back

Fig. F-3

1 2 3 4 5 Select

Value Range: -32768 ~ 32767

Trigger: by Time

Method: Instant

Speed: 1 Sec/Dot

Modbus Register Value(MV) Conversion

DataType: 4 Byte

Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$

Range

Low(RL): 0.0

High(RH): 4294967295.0

Scale

Unit:

Low(SL): -2147483648.0

High(SH): 2147483648.0

Events

Select dialog box options: 2 Byte, 4 Byte

Dialog box buttons: OK, Cancel

Fig. F-4

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Value Range: -32768 ~ 32767													
Trigger: by Time													
Method: Instant													
Speed: 1 Sec/Dot													
Modbus Register Value(MV) Conversion													
DataType: 2 Byte													
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL													
Range													
Low(RL): 0.0													
High(RH): 65535.0													
Scale													
Unit:													
Low(SL): 0.0													
High(SH): 65535.0													
Events													

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Fig. F-5

iv. Please modify the 『Scale』 range

Because the AI1 sensor range is -120.0 ~ 1000.0, so please modify Ext Scale Low(SL) from 0.0 to -120.0 and Scale High(SH) from 65535.0 to 1000.0

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Value Range: -32768 ~ 32767													
Trigger: by Time													
Method: Instant													
Speed: 1 Sec/Dot													
Modbus Register Value(MV) Conversion													
DataType: 2 Byte													
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL													
Range													
Low(RL): 0.0													
High(RH): 65535.0													
Scale													
Unit:													
Low(SL): 0.0													
High(SH): 65535.0													
Events													

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Fig. F-6

1	2	3	4	5	6	7	8	9	10	11	12	13	14			
Value Range: -32768 ~ 32767															▲	
Trigger: by Time															▲	
Method: Instant															▼	
Speed: 1 Sec/Dot															↶	
Modbus Register Value(MV) Conversion																
DataType: 2 Byte																
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL																
Range																
Low(RL): 0.0																
High(RH): 65535.0																
Scale																
Unit:																
Low(SL): -120.0																
High(SH): 65535.0																
Events															▼	
<div>◀ ▶ Copy</div>															Back	

Fig. F-7

1	2	3	4	5	6	7	8	9	10	11	12	13	14			
Value Range: -32768 ~ 32767															▲	
Trigger: by Time															▲	
Method: Instant															▼	
Speed: 1 Sec/Dot															↶	
Modbus Register Value(MV) Conversion																
DataType: 2 Byte																
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL																
Range																
Low(RL): 0.0																
High(RH): 65535.0																
Scale																
Unit:																
Low(SL): -120.0																
High(SH): 65535.0																
Events															▼	
<div>◀ ▶ Copy</div>															Back	

Fig. F-8

1 2 3 4 5 6 7 8 9 10 11 12 13 14

Value Range: -32768 ~ 32767

Trigger: by Time

Method: Instant

Speed: 1 Sec/Dot

Modbus Register Value(MV) Conversion

Data Type: 2 Byte

Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$

Range

Low(RL): 0.0

High(RH): 65535.0

Scale

Unit:

Low(SL): -120.0

High(SH): 1000.0

Events

Copy

Back

Fig. F-9

- v.** Repeat Step **iii** to Step **iv** for convert another AI value.

Appendix G

Ext Convert Example for DO and DO

i. Press 『Menu』 -> 『More』 -> 『Config』

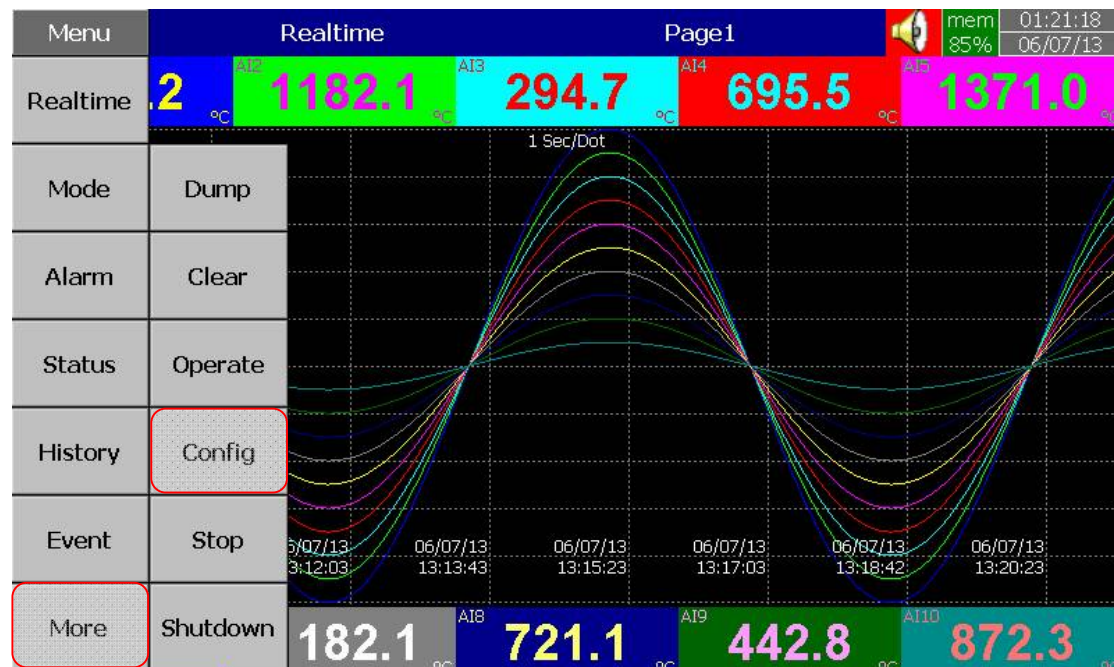


Fig. G-1

ii. Please select 『External』

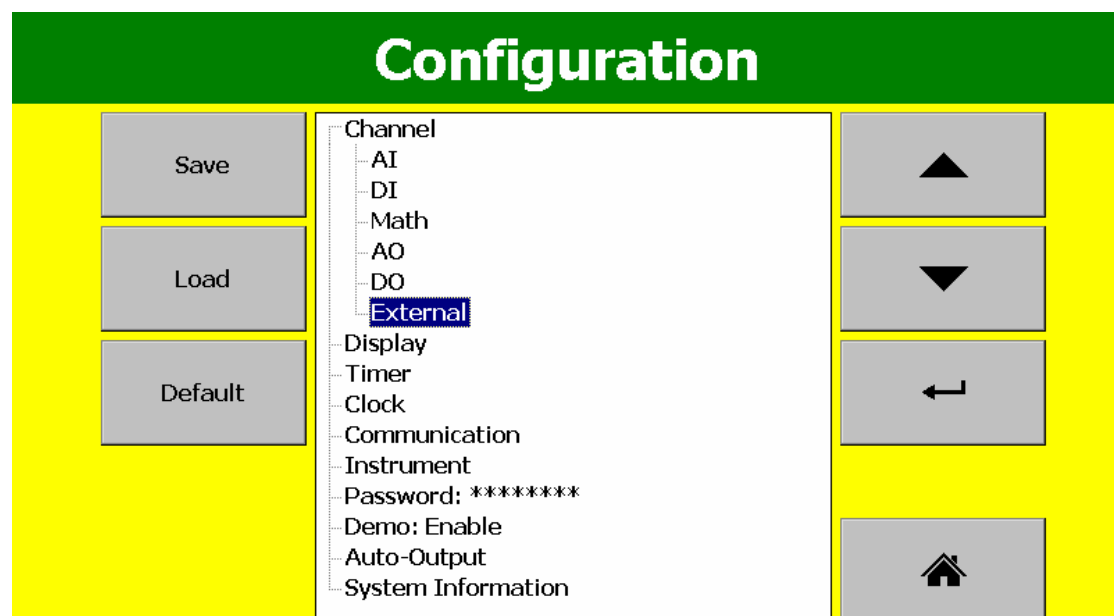


Fig. G-2

iii. Please modify the 『DataType』 from 『4 Byte』 to 『2 Byte』

1 2 3 4 5 6 7 8 9 10 11 12 13 14

- Value Range: -32768 ~ 32767
- Trigger: by Time
- Method: Instant
- Speed: 1 Sec/Dot
- Modbus Register Value(MV) Conversion
 - DataType: 4 Byte**
 - Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$
 - Range
 - Low(RL): 0.0
 - High(RH): 4294967295.0
 - Scale
 - Unit:
 - Low(SL): 0.0
 - High(SH): 4294967295.0
- Events

Navigation buttons: Up, Down, Enter, Left, Right, Copy, Back

Fig. G-3

1 2 3 4 5 Select

Value Range: -32768 ~ 32767

Trigger: by Time

Method: Instant

Speed: 1 Sec/Dot

Modbus Register Value(MV) Conversion

DataType: 4 Byte

Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$

Range

Low(RL): 0.0

High(RH): 4294967295.0

Scale

Unit:

Low(SL): -2147483648.0

High(SH): 2147483647.0

Events

Select dialog options: 2 Byte, 4 Byte

Dialog buttons: OK, Cancel

Fig. G-4

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Value Range: -32768 ~ 32767													
Trigger: by Time													
Method: Instant													
Speed: 1 Sec/Dot													
Modbus Register Value(MV) Conversion													
DataType: 2 Byte													
Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$													
Range													
Low(RL): 0.0													
High(RH): 65535.0													
Scale													
Unit:													
Low(SL): 0.0													
High(SH): 65535.0													
Events													

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Fig. G-5

iv. Please modify the 『Scale』 range

Because the DI and DO data not need to do convert, so please make sure Range Low(RL) and Scale Low(SL) is same and Range High(RH) and Scale High(SH) is same

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Speed: 1 Sec/Dot													
Modbus Register Value(MV) Conversion													
DataType: 2 Byte													
Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$													
Range													
Low(RL): 0.0													
High(RH): 65535.0													
Scale													
Unit:													
Low(SL): 0.0													
High(SH): 65535.0													
Events													
Add													
Remove													

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Fig. G-6

Appendix H

Ext Convert Example for AO

i. Press 『Menu』 -> 『More』 -> 『Config』

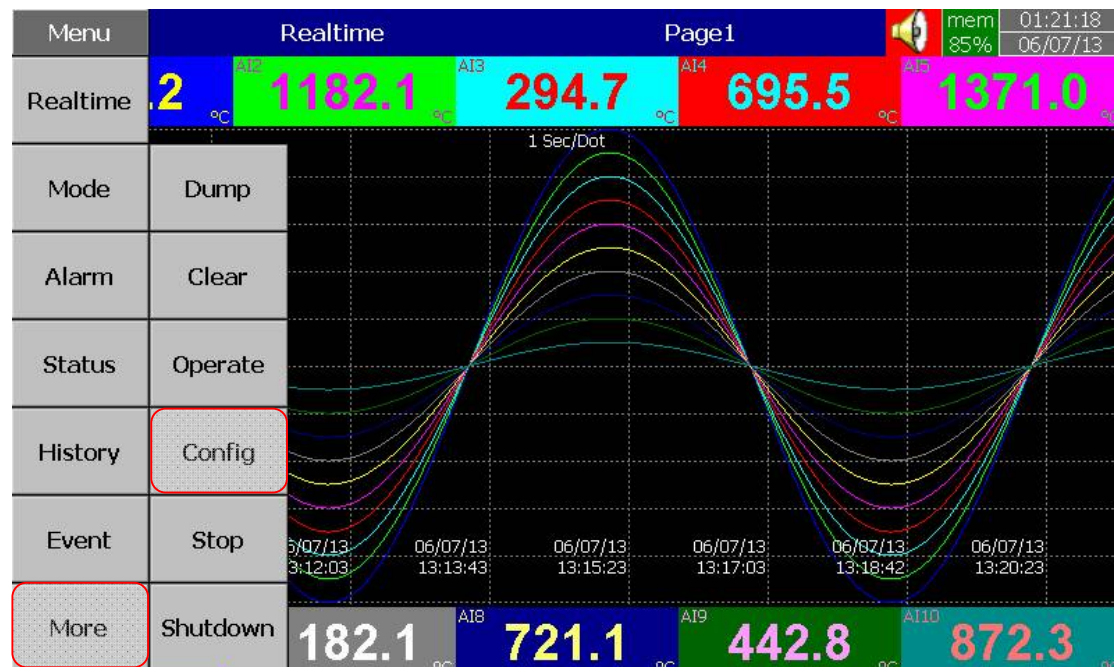


Fig. H-1

ii. Please select 『External』

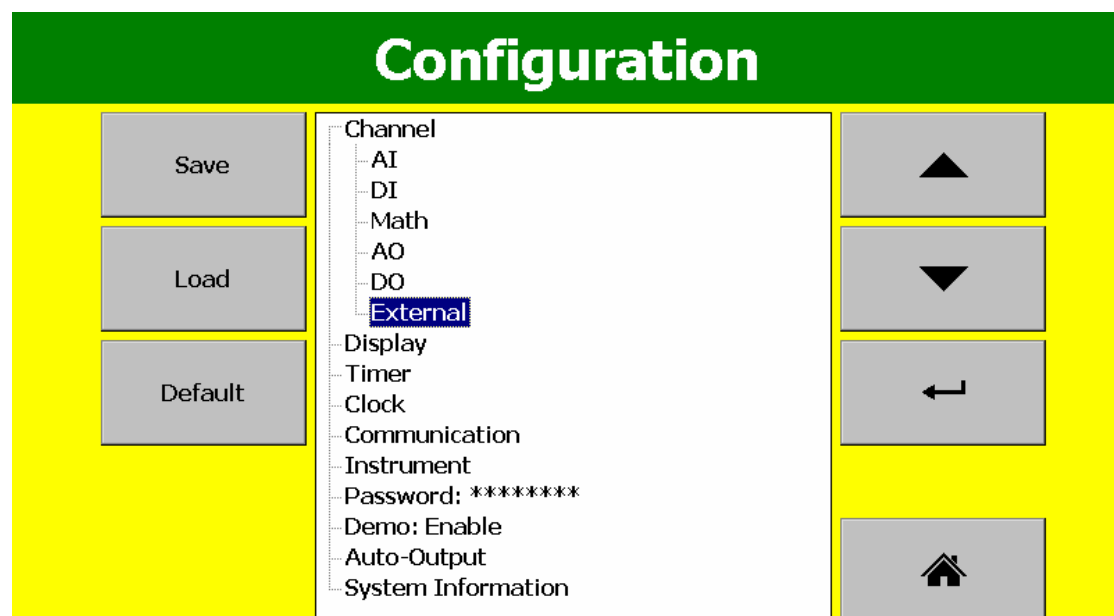


Fig. H-2

iii. Please modify the 『DataType』 from 『4 Byte』 to 『2 Byte』

1 2 3 4 5 6 7 8 9 10 11 12 13 14

- Value Range: -32768 ~ 32767
- Trigger: by Time
- Method: Instant
- Speed: 1 Sec/Dot
- Modbus Register Value(MV) Conversion
 - DataType: 4 Byte**
 - Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$
 - Range
 - Low(RL): 0.0
 - High(RH): 4294967295.0
 - Scale
 - Unit:
 - Low(SL): 0.0
 - High(SH): 4294967295.0
- Events

Navigation buttons: Left arrow, Right arrow, Copy, Back

Fig. H-3

1 2 3 4 5 Select

Value Range: -32768 ~ 32767

Trigger: by Time

Method: Instant

Speed: 1 Sec/Dot

Modbus Register Value(MV) Conversion

DataType: 2 Byte

Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$

Range

Low(RL): 0.0

High(RH): 4294967295.0

Scale

Unit:

Low(SL): -2147483648.0

High(SH): 2147483648.0

Events

Dialog box options: 2 Byte, 4 Byte

Dialog box buttons: OK, Cancel

Fig. H-4

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Value Range: -32768 ~ 32767													
Trigger: by Time													
Method: Instant													
Speed: 1 Sec/Dot													
Modbus Register Value(MV) Conversion													
DataType: 2 Byte													
Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$													
Range													
Low(RL): 0.0													
High(RH): 65535.0													
Scale													
Unit:													
Low(SL): 0.0													
High(SH): 65535.0													
Events													

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Fig. H-5

iv. Please modify the 『Scale』 range

Please modify Ext Scale Low(SL) from 0.0 to -32.768 and Scale High(SH) from 65535.0 to 32.767

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Value Range: -32768 ~ 32767													
Trigger: by Time													
Method: Instant													
Speed: 1 Sec/Dot													
Modbus Register Value(MV) Conversion													
DataType: 2 Byte													
Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$													
Range													
Low(RL): 0.0													
High(RH): 65535.0													
Scale													
Unit:													
Low(SL): 0.0													
High(SH): 65535.0													
Events													

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Fig. H-6

1	2	3	4	5	6	7	8	9	10	11	12	13	14						
Speed: 1 Sec/Dot															▲				
Modbus Register Value(MV) Conversion															▼				
DataType: 2 Byte																			
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL																			
Range																			
Low(RL): 0.0																			
High(RH): 65535.0																			
Scale																			
Unit:																			
Low(SL): -32.768															↶				
High(SH): 65535.0																			
Events																			
Add																			
Remove																			
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Fig. H-7

1	2	3	4	5	6	7	8	9	10	11	12	13	14						
Value Range: -32768 ~ 32767															▲				
Trigger: by Time															▼				
Method: Instant																			
Speed: 1 Sec/Dot																			
Modbus Register Value(MV) Conversion																			
DataType: 2 Byte																			
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL																			
Range																			
Low(RL): 0.0																			
High(RH): 65535.0																			
Scale																			
Unit:																			
Low(SL): -120.0																			
High(SH): 65535.0															↶				
Events																			
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Fig. H-8

1	2	3	4	5	6	7	8	9	10	11	12	13	14		
<ul style="list-style-type: none"> Speed: 1 Sec/Dot Modbus Register Value(MV) Conversion <ul style="list-style-type: none"> DataType: 2 Byte Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$ Range <ul style="list-style-type: none"> Low(RL): 0.0 High(RH): 65535.0 Scale <ul style="list-style-type: none"> Unit: Low(SL): -32.768 High(SH): 32.767 Events <ul style="list-style-type: none"> Add Remove 															▲
															▼
															↶
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Fig. H-9

Appendix I

Ext Convert Example for Math

i. Press 『Menu』 -> 『More』 -> 『Config』

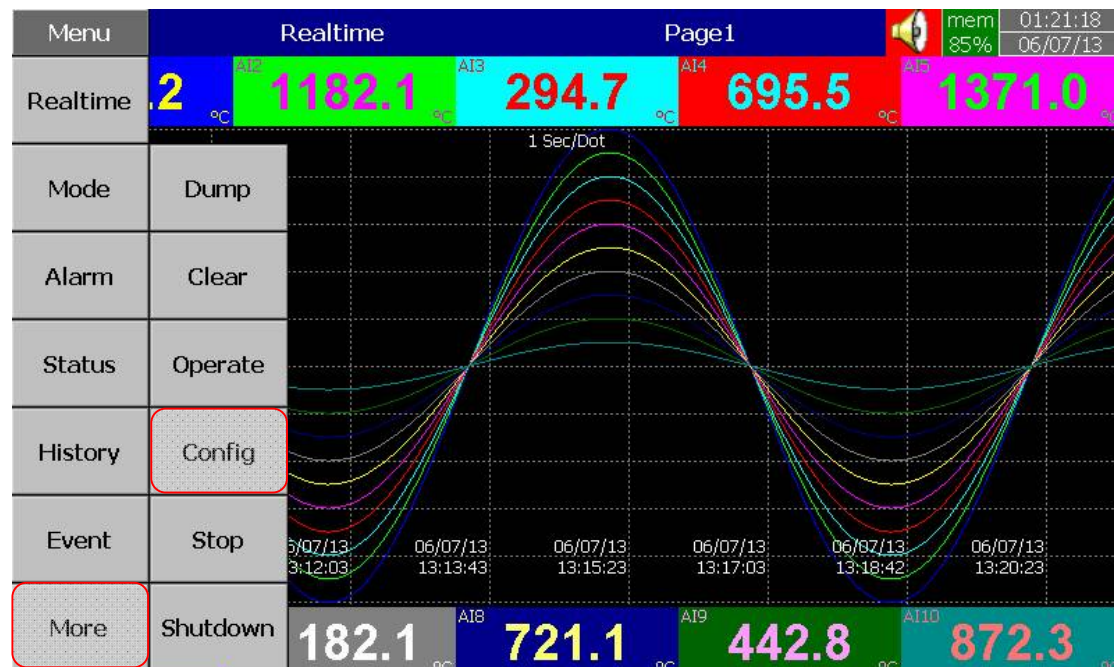


Fig. I-1

ii. Please select 『External』

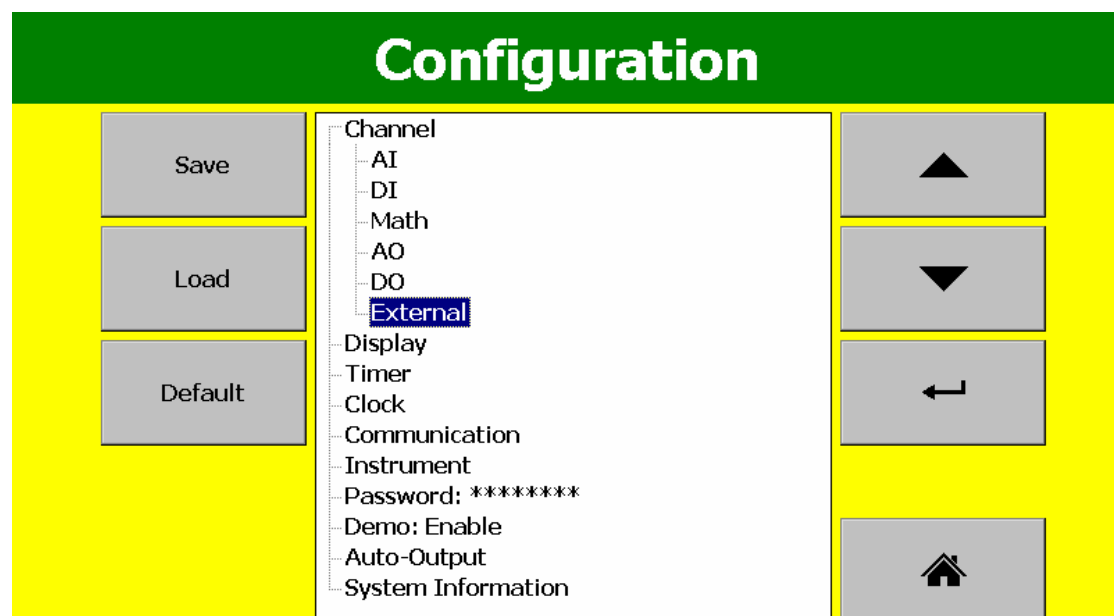


Fig. I-2

iii. Please set the 『DataType』 is 『4 Byte』

1 2 3 4 5 6 7 8 9 10 11 12 13 14

- Value Range: -32768 ~ 32767
- Trigger: by Time
- Method: Instant
- Speed: 1 Sec/Dot
- Modbus Register Value(MV) Conversion
 - DataType: 4 Byte**
 - Formula: $((MV-RL)/(RH-RL))*(SH-SL)+SL$
 - Range
 - Low(RL): 0.0
 - High(RH): 4294967295.0
 - Scale
 - Unit:
 - Low(SL): 0.0
 - High(SH): 4294967295.0
- Events

Navigation buttons: Up, Down, Return, Left, Right, Copy, Back

Fig. I-3

iv. Please modify the 『Scale』 range

Please modify the Ext Scale Low(SL) from 0.0 to -2147483648.0 and the Scale High(SH) from 4294967295.0 to 2147483647.0

Note: Because the Math can set "Decimal" value, so if the decimal is 0, please setting Scale Low(SL) to -2147483648.0 and Scale High(SH) to 2147483648.0.

If the decimal value is 1, please setting Scale Low(SL) to -2147478364.8 and Scale High(SH) to 214748364.8.

If the decimal value is 2, please setting Scale Low(SL) to -21474836.48 and Scale High(SH) to 21474836.47.

If the decimal value is 3, please setting Scale Low(SL) to -2147483.648 and Scale High(SH) to 2147483.647.

If the decimal value is 4, please setting Scale Low(SL) to -214748.3648 and Scale High(SH) to 214748.3647.

If the decimal value is 5, please setting Scale Low(SL) to -21474.83648 and Scale High(SH) to 21474.83647.

1	2	3	4	5	6	7	8	9	10	11	12	13	14								
Speed: 1 Sec/Dot																					
Modbus Register Value(MV) Conversion																					
Data Type: 4 Byte																					
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL																					
Range																					
Low(RL): 0.0																					
High(RH): 4294967295.0																					
Scale																					
Unit:																					
Low(SL): 0.0																					
High(SH): 4294967295.0																					
Events																					
Add																					
Remove																					
◀					▶					Copy										Back	

Fig. I-4

1	2	3	4	5	6	7	8	9	10	11	12	13	14								
Speed: 1 Sec/Dot																					
Modbus Register Value(MV) Conversion																					
Data Type: 4 Byte																					
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL																					
Range																					
Low(RL): 0.0																					
High(RH): 4294967295.0																					
Scale																					
Unit:																					
Low(SL): -2147483648.0																					
High(SH): 4294967295.0																					
Events																					
Add																					
Remove																					
◀					▶					Copy										Back	

Fig. I-5

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Speed: 1 Sec/Dot													
Modbus Register Value(MV) Conversion													
DataType: 4 Byte													
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL													
Range													
Low(RL): 0.0													
High(RH): 4294967295.0													
Scale													
Unit:													
Low(SL): -2147483648.0													
High(SH): 4294967295.0													
Events													
Add													
Remove													

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Fig. I-6

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Speed: 1 Sec/Dot													
Modbus Register Value(MV) Conversion													
DataType: 4 Byte													
Formula: ((MV-RL)/(RH-RL))*(SH-SL)+SL													
Range													
Low(RL): 0.0													
High(RH): 4294967295.0													
Scale													
Unit:													
Low(SL): -2147483648.0													
High(SH): 2147483647.0													
Events													
Add													
Remove													

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Fig. I-7

v. Repeat Step **iii** to Step **iv** for convert another Math value.