User's Manual

Model NC210
RS485/CC-Link Converter Profile
Common Manual

This user's manual describes the common explanation for Profile 001,002,003,061,101 and 201.
The Profile is the assignment of data registers which are used when measured data and control data are exchanged via CC-Link communication between CC-Link units of sequencer (such as Mitsubishi Electric Corporation's MELSEC) and local instrument (digital indicating controller, signal converter or power monitor).
When the instrument data are read out or are written in, first of all do [check the instrument connection condition] and [Mode confirmation and change], and then operate in accordance with each Profile procedure.
This user's manual should be kept in safety place.

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Yokogawa Electric Corporation

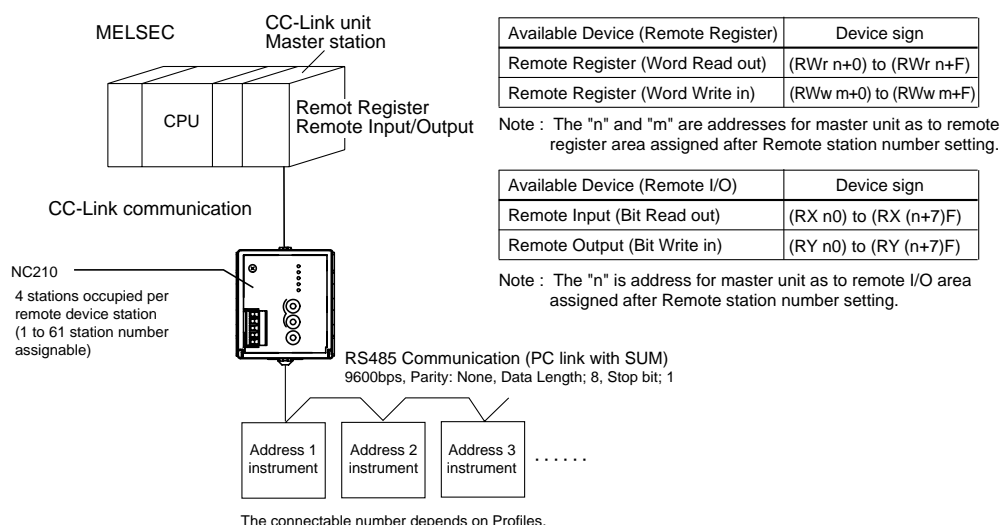## 1. CONNECTABLE INSTRUMENT LIST AND FUNCTION

The NC210 converter differs from connectable instrument, read out function, write in function and usable mode in accordance with the Profile.

Profile	Connectable Instrument	Read out Function	Write in Function	Usable Mode
001	UT350/UT320 UT450/UT420 UT550/UT520 UT750 (Max. 8 units)	●Measured input (PV) ●Control Output (OUT) ●Auto/Man status (A/M) ●Remote/Local Status (R/L) ●Alarm Status (AL1 to AL3)	●Setpoint (SP) ●Output (MOUT) ●Auto/Man status (A/M) ●Remote/Local Status (R/L)	Data monitoring Mode
		●Operation Parameter ●Set-up Parameter	●Operation Parameter ●Set-up Parameter	Parameter Setting Mode
002	UT350/UT320 UT450/UT420 UT550/UT520 UT750 (Max. 8 units)	●Measured input (PV) ●Setpoint (CSP) ●Auto/Man status (A/M) ●Remote/Local Status (R/L) ●Alarm Status (AL1 to AL3)	●Setpoint (SP) ●Output (MOUT) ●Auto/Man status (A/M) ●Remote/Local Status (R/L)	Data monitoring Mode
		●Operation Parameter ●Set-up Parameter	●Operation Parameter ●Set-up Parameter	Parameter Setting Mode
003	UT350/UT320 UT450/UT420 UT550/UT520 UT750 (Max. 5 units)	●Measured input (PV) ●Control Output (OUT) ●Setpoint (CSP) ●Auto/Man status (A/M) ●Remote/Local Status (R/L) ●Alarm Status (AL1 to AL3)	●Setpoint (SP) ●Output (MOUT) ●Auto/Man status (A/M) ●Remote/Local Status (R/L)	Data monitoring Mode
		●Operation Parameter ●Set-up Parameter	●Operation Parameter ●Set-up Parameter	Parameter Setting Mode
061	UP550/UP750 (one unit)	●Measured input (PV) ●Setpoint (CSP) ●Control Output (OUT) ●Pattern Number (PTN) ●Current Segment Number (SEGNO) ●Segment Time (TIME) ●Hold SP (HOLDSP) ●Hold Time (HOLDTM) ●Hold Status (HOLD) ●Operation Status (P/R/L) ●Auto/Man status (A/M) ●Alarm Status (AL1 to AL4) ●PV Event (PVE1 to PVE8) ●Time Event (TME1 to TME16)	●Setpoint (SP) ●Output (MOUT) ●Hold SP (HOLDSP) ●Hold Time (HOLDTM) ●Hold Status (HOLD) ●Advance (ADV) ●Operation Status (P/R/L) ●Auto/Man status (A/M)	Data monitoring Mode
		●Operation Parameter ●Set-up Parameter	●Operation Parameter ●Set-up Parameter	Parameter Setting Mode
		●Program Parameter	●Program Parameter	Program Setting Mode
101	JUXTA VJ Series (Max. 16 units)	●Output	No Write in	Data monitoring Mode
201	PR201/UZ005 (Max. 4 units)	●Integrated Power ●Instantaneuos Power	●PT(VT) ratio ●CT ratio	Data monitoring Mode
		●Parameters	●Parameters	Parameter Setting Mode

2. I/O COMMUNICATION

The ND210 converter starts I/O communication when it is registered in the scan-list of the DeviceNet master.
Accessing the relative area of the master unit from MELSEC Sequencer CPU, it can be done via NC210 that read out and write in the various data (such as measured values, control data, alarm flags and so on) of controller, signal converter and power monitor.

Available Device (Remote Register)	Device sign
Remote Register (Word Read out)	(RWr n+0) to (RWr n+F)
Remote Register (Word Write in)	(RWw m+0) to (RWw m+F)

Note : The "n" and "m" are addresses for master unit as to remote register area assigned after Remote station number setting.

Available Device (Remote I/O)	Device sign
Remote Input (Bit Read out)	(RX n0) to (RX (n+7)F)
Remote Output (Bit Write in)	(RY n0) to (RY (n+7)F)

Note : The "n" is address for master unit as to remote I/O area assigned after Remote station number setting.

RS485 Communication (PC link with SUM)
9600bps, Parity: None, Data Length; 8, Stop bit; 1

The connectable number depends on Profiles.

3. CHECK OF INSTRUMENT CONNECTION CONDITION

When not receiving the response from the connected instrument such as a temperature controller, the NC210 judges that the instrument is not connected. Then the NC210 stops communication with the instrument and communicates only with the instrument normally connected.
When re-scanning is requested, the NC210 tries to communicate with all instruments addresses are assigned to again.

Please check the connection condition of instrument as following procedure (1) to (3).

[PROCEDURE]
(1) Read out the Remote READY Flag [RX (n+7)B]. And check that it is [1].
(2) For checking the connected instrument read out the Normal connection slave flag [corresponding RX (n+5)0 to RX (n+5)F] and check the instrument is normal connection or not. The area for read out differs from the Profile and connected instrument number.
    0: unconnected condition
    1: connected condition
(3) If there is a unconnected instrument, make Re-Scan Request Flag [RY (n+5)F] from [0] to [1].

4. MODE CONFIGURATION AND CHANGE METHOD

The NC210 converter has three type of mode. These modes are Data monitoring Mode, Parameter Setting Mode and Program Setting Mode. The mode change can be done by writing in each mode require flag [(RY n0) to (RY n2)] as follows.

Mode	RY n2	RY n1	RY n0
Data Monitoring Mode	0	0	1
Parameter Setting Mode	0	1	0
Program Setting Mode	1	0	0

(Note 1) When the mode changes from Data Monitoring Mode to other modes, Remote Register [RWr (n+0) to RWr (n+F)] and Remote inout/output [RX n8 to RX (n+4)F] become [0]. When the mode changes from other modes to Data Monitoring Mode, the previous data of RWr and RX are indicated the same data of last Data Monitoring Mode.
(Note 2) By changing mode, the receive data valid flag (RX n3) becomes [0]. When read out data in Data Monitoring Mode, check that the receive data valid flag becomes [1] and then change the mode.
(Note 3) When the mode is changed, the Normal connection slave flag is maintained.
(Note 4) At power on, the NC210 is in Data Monitoring Mode.

⚠ IMPORTANT

When word accessing to each requiring flags [(RY n0) to (RY n2)], pay attention to the other bits in [(RY n3) to (RY nF)].

5. LADDER SAMPLE PROGRAM

<Configuration>

- CPU: A1SJH
- SLOT0: DC input unit A1SX40
- SLOT1: Contact output unit A1SY18A
- SLOT2: CC-Link master A1SJ6BT11--- Station number=0

Spare — MELSEC-A series (Mitsubishi Electric Corporation's sequencer)

CC-Link

NC210-02-003
Remote device
4 station occupied
Station number=1

NC210-02-***
Remote device
4 station occupied
Station number=5

RS-485

PC link with SUM, 9600bps, Parity: None,
Data length: 8, Stop bit: 1

UT550 Address 1
UT550 Address 2
UT550 Address 3
UT550 Address 4
UT550 Address 5
UTxxx Address n

Yokogawa M&C Corporation's
Digital indicating controllers
UT550×5

Yokogawa M&C Corporation's
Digital indicating controllers
UTxxx

<Registration of Memory>

MELSEC CPU | CC-Link Master | NC210 Station number=1 | NC210 Station number=5

D200 to D215 → 0x02E0 to 0x02EF → RWr — CC-Link → 16 word ← From RS-485 UT550
D216 to D231 → 0x02F0 to 0x02FF → RWr — CC-Link → 16 word ← 485
(FROM instruction)

D300 to D315 → 0x01E0 to 0x01EF → RWw — CC-Link → 16 word → To RS-485 UT550
D316 to D331 → 0x01F0 to 0x01FF → RWw — CC-Link → 16 word → 485
(TO instruction)

M0 to M127 → 0x00E0 to 0x00E7 → RX — CC-Link → 128 bit ← From RS-485 UT550
M128 to M255 → 0x00E8 to 0x00EF → RX — CC-Link → 128 bit ← 485
(FROM instruction)

M300 to M427 → 0x0160 to 0x0167 → RY — CC-Link → 128 bit → To RS-485 UT550
M428 to M555 → 0x0168 to 0x016F → RY — CC-Link → 128 bit → 485
(TO instruction)

The NC210 basically operates in Data Monitoring Mode in this sample program.
The sample program makes the following items possible in system configuration figure.
1) Registers the NC210 data in CC-Link master.
2) Gets UT550 data, and stores it in D register of MELSEC CPU(always)
3) When Contact 0 of MELSEC=ON, writes 62.7 in SP of communication-address-1 UT550.
4) When Contact 1 of MELSEC=ON, writes 10.0 in SP of communication-address-1 UT550.
5) When Contact 2 of MELSEC=ON, transfers to Parameter Setting Mode, and rewrites 100.0, OFF and OFF in PID of communication-address-2 UT550 respectively, then returns to Data Monitoring Mode.
6) When Contact 3 of MELSEC=ON, sets A/M of communication-address-1 UT550 to MAN, and sets 30.0 in MOUT value.
7) When Contact 4 of MELSEC=ON, sets A/M of communication-address-1 UT550 to AUTO.

<Ladder Program>

Block 1:
- X20 X2F → PLS M800
- M800 → SET M801
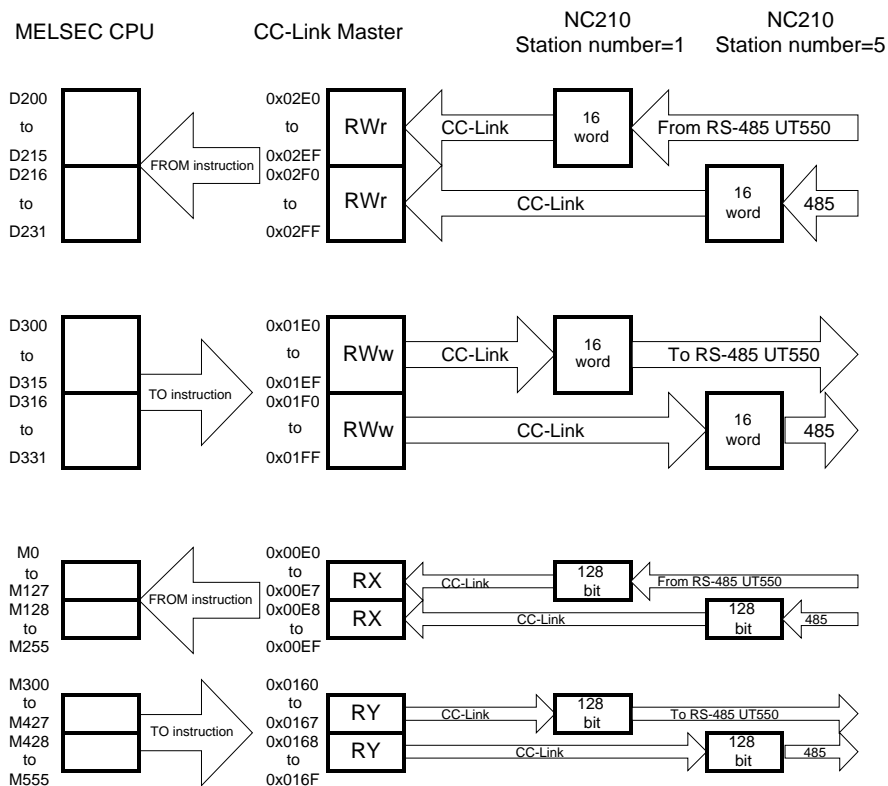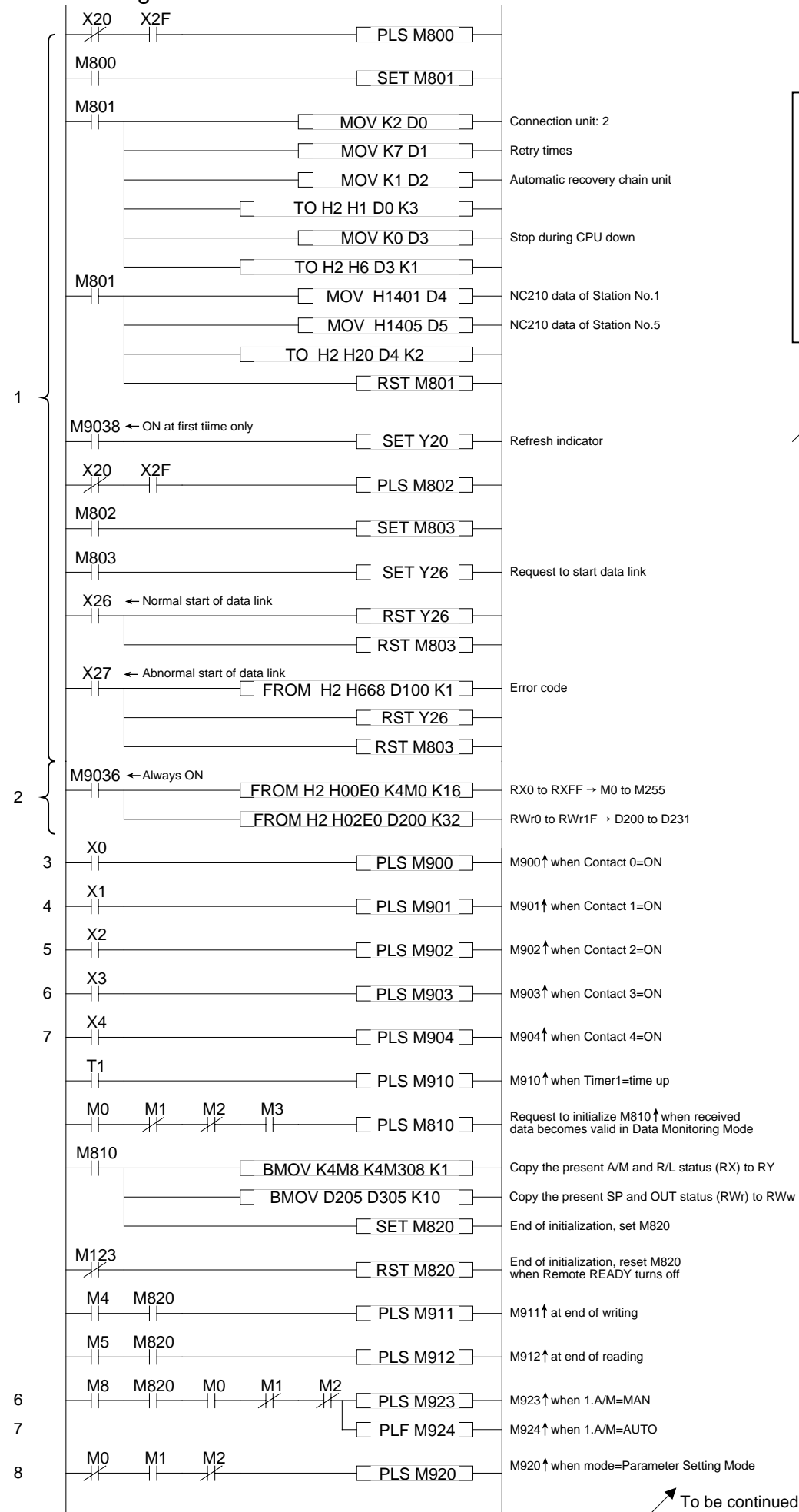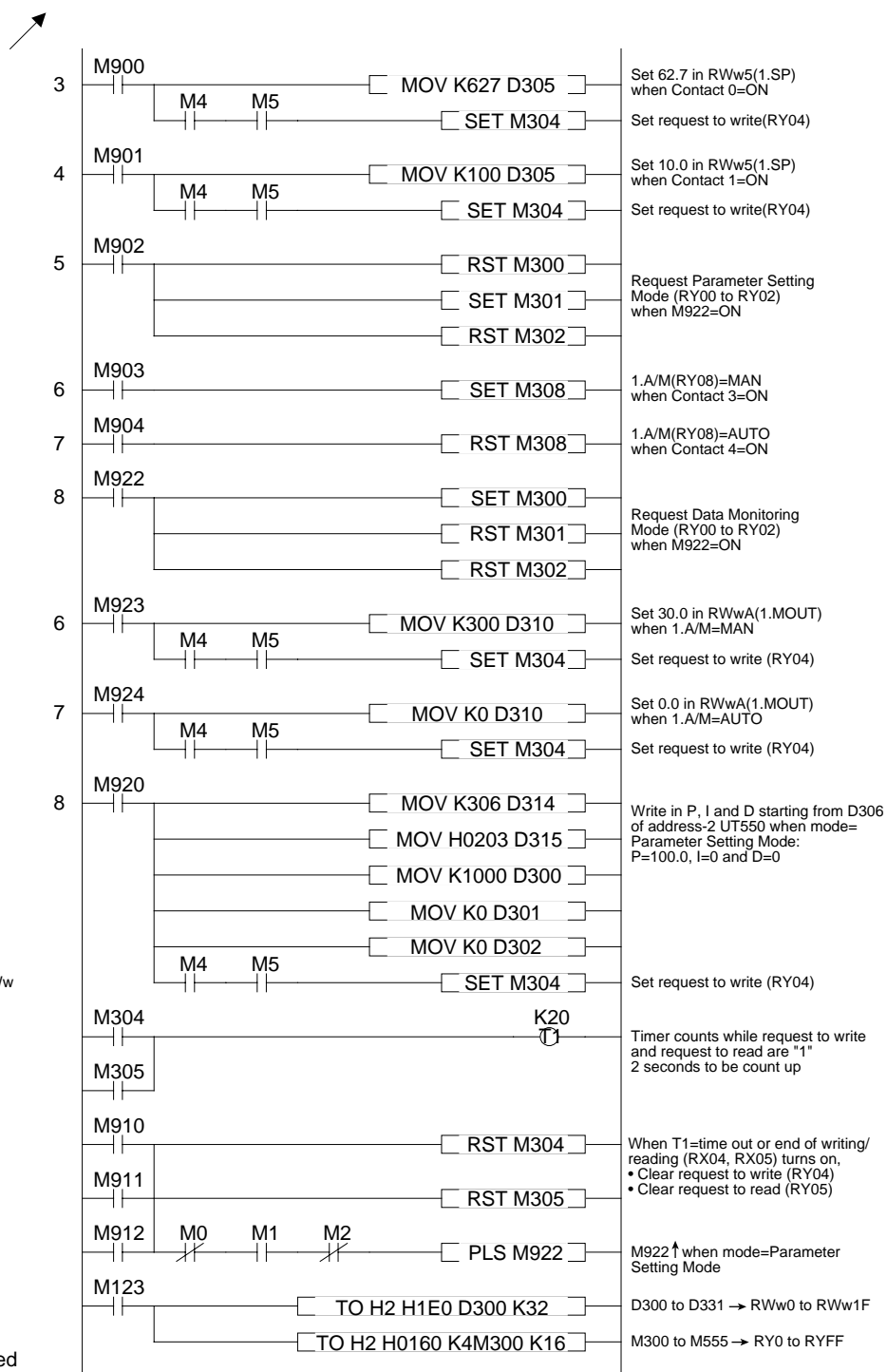- M801 → MOV K2 D0 — Connection unit: 2
  - MOV K7 D1 — Retry times
  - MOV K1 D2 — Automatic recovery chain unit
  - TO H2 H1 D0 K3
  - MOV K0 D3 — Stop during CPU down
  - TO H2 H6 D3 K1
- M801 → MOV H1401 D4 — NC210 data of Station No.1
  - MOV H1405 D5 — NC210 data of Station No.5
  - TO H2 H20 D4 K2
  - RST M801
- M9038 ← ON at first time only → SET Y20 — Refresh indicator
- X20 X2F → PLS M802
- M802 → SET M803
- M803 → SET Y26 — Request to start data link

Block 2:
- X26 ← Normal start of data link → RST Y26, RST M803
- X27 ← Abnormal start of data link → FROM H2 H668 D100 K1 — Error code, RST Y26, RST M803
- M9036 ← Always ON → FROM H2 H00E0 K4M0 K16 — RX0 to RXFF → M0 to M255
  - FROM H2 H02E0 D200 K32 — RWr0 to RWr1F → D200 to D231

Block 3:
- X0 → PLS M900 — M900↑ when Contact 0=ON

Block 4:
- X1 → PLS M901 — M901↑ when Contact 1=ON

Block 5:
- X2 → PLS M902 — M902↑ when Contact 2=ON

Block 6:
- X3 → PLS M903 — M903↑ when Contact 3=ON

Block 7:
- X4 → PLS M904 — M904↑ when Contact 4=ON

- T1 → PLS M910 — M910↑ when Timer1=time up
- M0 M1 M2 M3 → PLS M810 — Request to initialize M810↑ when received data becomes valid in Data Monitoring Mode
- M810 → BMOV K4M8 K4M308 K1 — Copy the present A/M and R/L status (RX) to RY
  - BMOV D205 D305 K10 — Copy the present SP and OUT status (RWr) to RWw
  - SET M820 — End of initialization, set M820
- M123 → RST M820 — End of initialization, reset M820 when Remote READY turns off
- M4 M820 → PLS M911 — M911↑ at end of writing
- M5 M820 → PLS M912 — M912↑ at end of reading

Block 6:
- M8 M820 M0 M1 M2 → PLS M923 — M923↑ when 1.A/M=MAN

Block 7:
- → PLF M924 — M924↑ when 1.A/M=AUTO

Block 8:
- M0 M1 M2 → PLS M920 — M920↑ when mode=Parameter Setting Mode

To be continued

Block 3:
- M900 → MOV K627 D305 — Set 62.7 in RWw5(1.SP) when Contact 0=ON
  - M4 M5 → SET M304 — Set request to write(RY04)

Block 4:
- M901 → MOV K100 D305 — Set 10.0 in RWw5(1.SP) when Contact 1=ON
  - M4 M5 → SET M304 — Set request to write(RY04)

Block 5:
- M902 → RST M300, SET M301, RST M302 — Request Parameter Setting Mode (RY00 to RY02) when M922=ON

Block 6:
- M903 → SET M308 — 1.A/M(RY08)=MAN when Contact 3=ON

Block 7:
- M904 → RST M308 — 1.A/M(RY08)=AUTO when Contact 4=ON

Block 8:
- M922 → SET M300, RST M301, RST M302 — Request Data Monitoring Mode (RY00 to RY02) when M922=ON

Block 6:
- M923 → MOV K300 D310 — Set 30.0 in RWwA(1.MOUT) when 1.A/M=MAN
  - M4 M5 → SET M304 — Set request to write (RY04)

Block 7:
- M924 → MOV K0 D310 — Set 0.0 in RWwA(1.MOUT) when 1.A/M=AUTO
  - M4 M5 → SET M304 — Set request to write (RY04)

Block 8:
- M920 → MOV K306 D314 — Write in P, I and D starting from D306 of address-2 UT550 when mode= Parameter Setting Mode: P=100.0, I=0 and D=0
  - MOV H0203 D315
  - MOV K1000 D300
  - MOV K0 D301
  - MOV K0 D302
  - M4 M5 → SET M304 — Set request to write (RY04)

- M304 → K20 T1 — Timer counts while request to write and request to read are "1" 2 seconds to be count up
- M305 →
- M910 / M911 → RST M304 — When T1=time out or end of writing/reading (RX04, RX05) turns on, • Clear request to write (RY04) • Clear request to read (RY05)
  - → RST M305
- M912 M0 M1 M2 → PLS M922 — M922↑ when mode=Parameter Setting Mode
- M123 → TO H2 H1E0 D300 K32 — D300 to D331 → RWw0 to RWw1F
  - TO H2 H0160 K4M300 K16 — M300 to M555 → RY0 to RYFF

IM 77P01C01-02E