

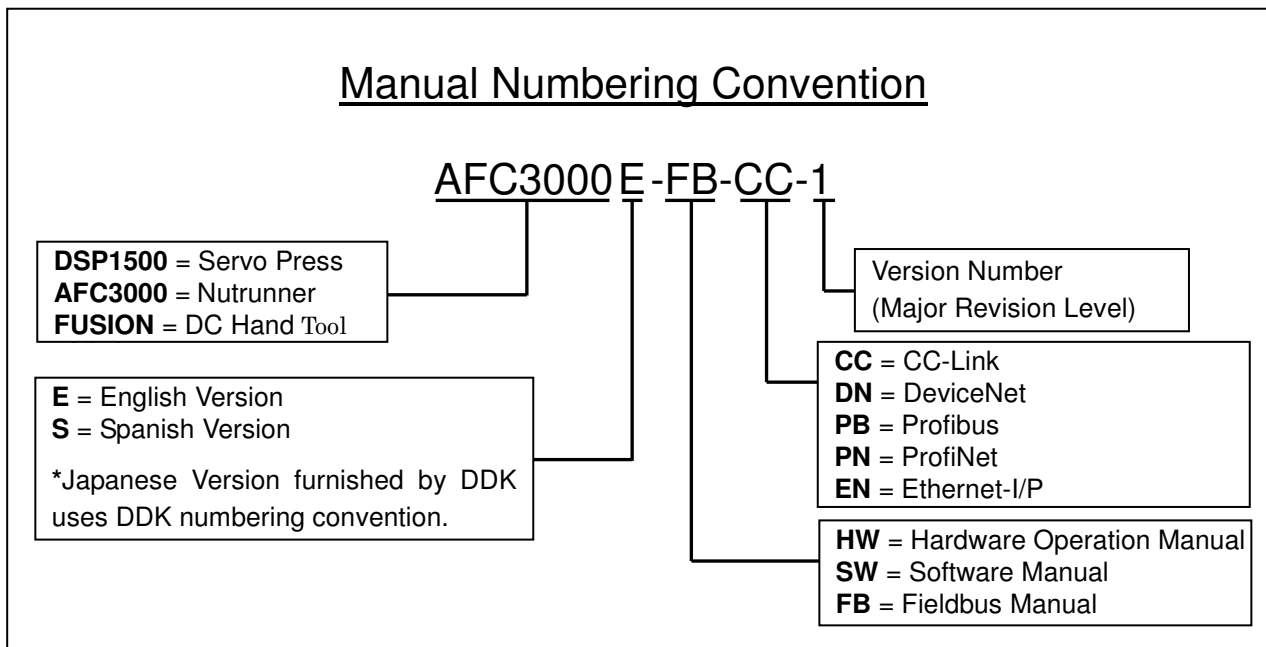
AFC3000

MFC-CC CC-LINK FIELDBUS EXPANSION UNIT



Revision History

Revision Date	Manual No.	Contents of Revision
03/XX/2014	AFC3000E-FB-CC-1	First Edition
01/08/2017	AFC3000E-FB-CC-1	Added Message Bank Select function
01/08/2017	AFC3000E-FB-CC-1	Added Message Bank Select function
01/19/2018	AFC3000E-FB-CC-1	Minor revision - Message Output formats fixed (pg.17-28)
05/14/2019	AFC3000E-FB-CC-1	Minor revision – ERR LED off updated “No Error” “ (pg.5)



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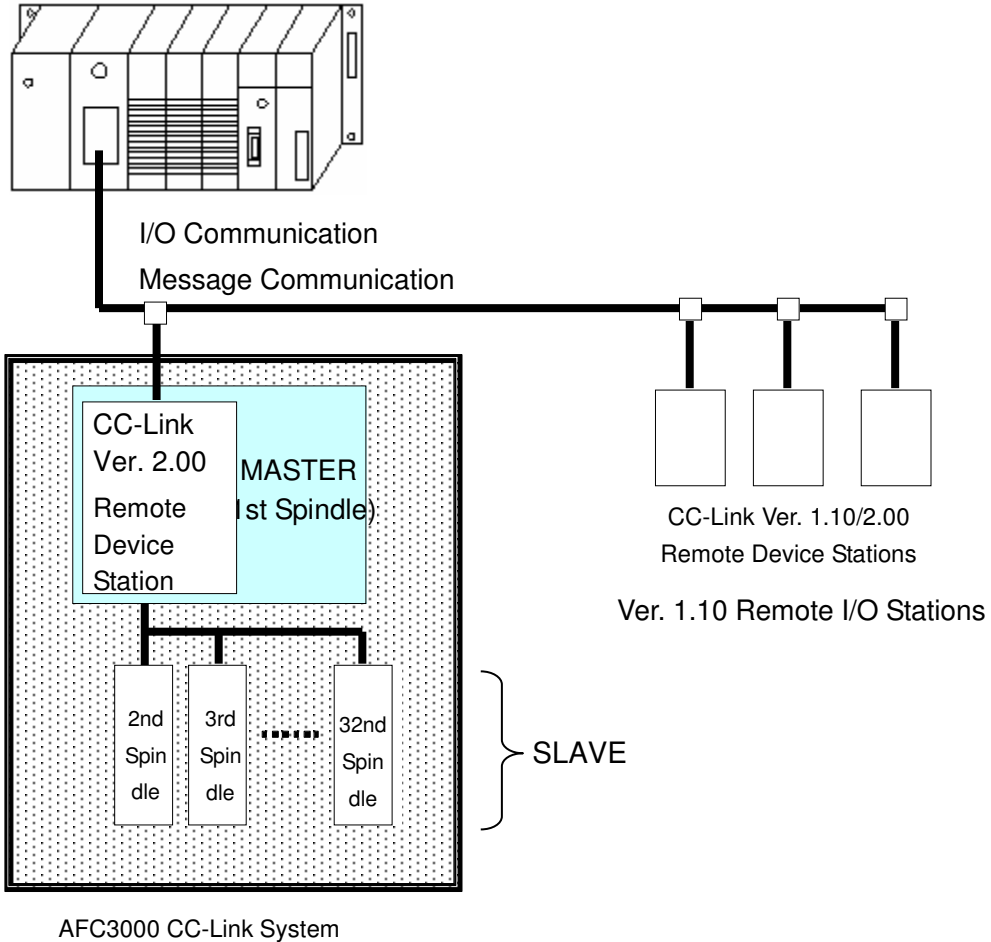
CC-Link

The AFC3000 CC-Link System conforms to the open field network CC-Link Ver 2.00. Control of tools and transaction of message information are executed by the CCLINK communication connection.

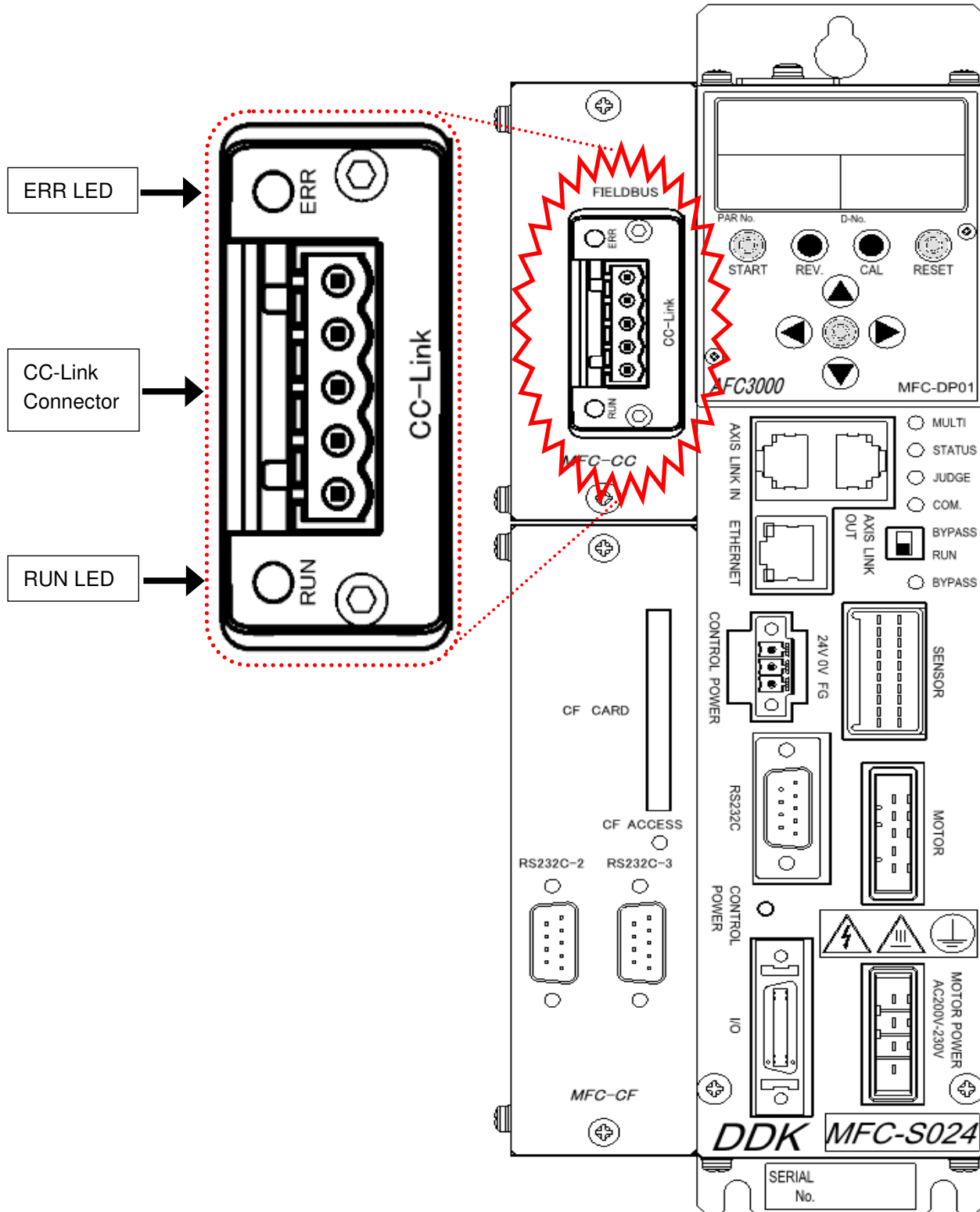
Due to conformance with the open field network CC-Link Ver. 2.00 System, connections with a CC-Link Ver. 2.0 master station, Ver. 1.10/2.00 remote device stations, and Ver. 1.10 remote I/O stations are enabled. Also, I/O communication and message communication can be executed at the same time.

System Structure (CC-Link)

PLC (CC-Link Ver. 2.00 Master Station)



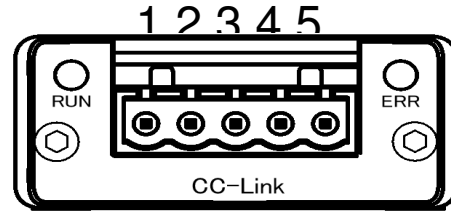
Description of the Hardware (CC-Link)



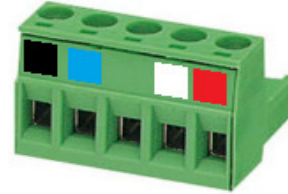
CC-Link Fieldbus Expansion Unit

• Module Pin Configuration

No.	Signal	Wire Color	Description
1	DA	Black	Sending side
2	DB	Blue	Receiving side
3	DG	-	Signal ground
4	SLD	White	Shield
5	FG	Red	Ground



Manufacturer: Phoenix Contact
 Type: Connector plug
 Model: MSTB 2.5/5-ST-5.08 AU M
 Applicable wire size: AWG 14 to 23 or 0.25mm² to 2.5mm²
 * The connector is included with the equipment.
 Please prepare the cable on your own.



The cable wiring method is the same as that for the control power. Please refer to "Control Power Wiring Procedures" of "Input Power Source Connection" on Section 4-4.

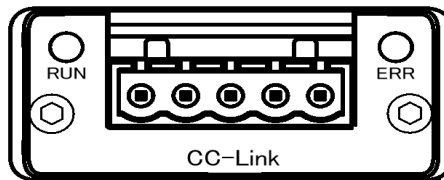
However, the compatible wire size and recommended pin terminals (ferrules) are as follows.

- Compatible wire size ··· AWG 23 to 14 (0.25mm² to 2.5mm²)
- Recommended pin terminals (ferrules)
 - Model: AI 2,5-6 BU (Phoenix Contact)



• **Be sure to connect the cable with all power turned OFF.**

The module LEDs indicate the states of the nodes of the AFC3000 CC-Link System and the network state.



A: RUN LED

B: ERR LED

• List of LED Indications

LED	Color	State		Details	
A	RUN LED	OFF	Off	Offline	Power is not supplied or connection is not established.
		Green	Lit up	Online	Communicating normally.
		Red	Lit up	Error	A critical error has occurred.
B	ERR LED	OFF	Off	Offline	No Error
		Red	Lit up	Error	A critical error has occurred.
			Flickering	CRC error	A cyclic redundancy check (CRC) error has occurred.
		Flash	Minor error	Station No. or baud rate setting is changed after power activation.	

CC-Link Fieldbus Expansion Unit

I/O Specifications (CC-Link)

	I/O Input/Output		Message Input/Output	
	MASTER Spindle → PLC	PLC → MASTER Spindle	MASTER Spindle → PLC	PLC → MASTER Spindle
Maximum Setting	110 bytes (880 points)	110 bytes (880 points)	88 words (176 bytes)	87 words (174 bytes)
Standard Setting	110 bytes (880 points)	110 bytes (880 points)	72 words (144 bytes)	71 words (142 bytes)

<Size per Station · Extended cyclic setting = 1 * PLC CC-Link V1.10 Master Station ▼

Type	1 Occupied Station		2 Occupied Stations		3 Occupied Stations		4 Occupied Stations	
	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points
RX	32 points*1	16 points	64 points*1	48 points	96 points*1	80 points	128 points*1	112 points
RY		16 points		48 points		80 points		112 points
RWw	4 words		8 words		12 words		16 words	
RWr*2	3 words		7 words		11 words		15 words	

<Size per Station · Extended cyclic setting = 2

Type	1 Occupied Station		2 Occupied Stations		3 Occupied Stations		4 Occupied Stations	
	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points
RX	32 points*1	16 points	96 points*1	80 points	160 points*1	144 points	224 points*1	208 points
RY		16 points		80 points		144 points		208 points
RWw	8 words		16 words		24 words		32 words	
RWr*2	7 words		15 words		23 words		31 words	

<Size per Station · Extended cyclic setting = 4

Type	1 Occupied Station		2 Occupied Stations		3 Occupied Stations		4 Occupied Stations	
	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points
RX	64 points*1	48 points	192 points*1	176 points	320 points*1	304 points	448 points*1	432 points
RY		48 points		176 points		304 points		432 points
RWw	16 words		32 words		48 words		64 words	
RWr*2	15 words		31 words		47 words		63 words	

<Size per Station · Extended cyclic setting = 8 * CCLINK ver. 2 Standard Setting ▼

Type	1 Occupied Station		2 Occupied Stations		3 Occupied Stations		4 Occupied Stations	
	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points	Number of Occupied Points	Number of Available Points
RX	128 points*1	112 points	384 points*1	368 points	640 points*1	624 points	896 points*1	880 points
RY		112 points		368 points		624 points		880 points
RWw	32 words		64 words		88 words*3		72 words*3	
RWr*2	31 words		63 words		87 words*3		71 words*3	

*1: Last 16 of the occupied points (Input/Output) are used by the CCLINK system area and the number of available points is decreased accordingly.

*2: With RWr, 1 word is used for the error code and the area thereof is therefore 1 word less than that of RWw.

*3: The message input/output setting is restricted to a maximum of 256 bytes that is the total of the remote input/output (RX/RY) and the remote registers (RWw/RWr) (640 points + 88 words, 896 points + 72 words).

CC-Link Fieldbus Expansion Unit

• AFC3000 CC-Link V2 System Signal Specifications (PLC → MASTER Spindle)

Address	BIT	Signal	Address	BIT	Signal
RY(n+0h)0h	0	STOP	RY(n+3h)0h	48	BYPASS No.1
RY(n+0h)1h	1	RESET	RY(n+3h)1h	49	BYPASS No.2
RY(n+0h)2h	2	REVERSE	RY(n+3h)2h	50	BYPASS No.3
RY(n+0h)3h	3	START	RY(n+3h)3h	51	BYPASS No.4
RY(n+0h)4h	4	(SEQ SELECT BIT 0)	RY(n+3h)4h	52	BYPASS No.5
RY(n+0h)5h	5	(SEQ SELECT BIT 1)	RY(n+3h)5h	53	BYPASS No.6
RY(n+0h)6h	6	(SEQ SELECT BIT 2)	RY(n+3h)6h	54	BYPASS No.7
RY(n+0h)7h	7	(SEQ SELECT BIT 3)	RY(n+3h)7h	55	BYPASS No.8
RY(n+0h)8h	8	(SEQ SELECT BIT 4)	RY(n+3h)8h	56	BYPASS No.9
RY(n+0h)9h	9	CYCLE COUNT UP	RY(n+3h)9h	57	BYPASS No.10
RY(n+0h)Ah	10	CYCLE COUNT CLEAR	RY(n+3h)Ah	58	ID DATA CLEAR
RY(n+0h)Bh	11	SEQ SELECT No. ENABLE	RY(n+3h)Bh	59	ID SELECT ENABLE
RY(n+0h)Ch	12	INPORT 1	RY(n+3h)Ch	60	Not used
RY(n+0h)Dh	13	INPORT 2	RY(n+3h)Dh	61	Not used
RY(n+0h)Eh	14	INPORT 3	RY(n+3h)Eh	62	Not used
RY(n+0h)Fh	15	INPORT 4	RY(n+3h)Fh	63	Not used
RY(n+1h)0h	16	SEQ SELECT No.1*	RY(n+4h)0h	64	BYPASS No.11
RY(n+1h)1h	17	SEQ SELECT No.2	RY(n+4h)1h	65	BYPASS No.12
RY(n+1h)2h	18	SEQ SELECT No.3	RY(n+4h)2h	66	BYPASS No.13
RY(n+1h)3h	19	SEQ SELECT No.4	RY(n+4h)3h	67	BYPASS No.14
RY(n+1h)4h	20	SEQ SELECT No.5	RY(n+4h)4h	68	BYPASS No.15
RY(n+1h)5h	21	SEQ SELECT No.6	RY(n+4h)5h	69	BYPASS No.16
RY(n+1h)6h	22	SEQ SELECT No.7	RY(n+4h)6h	70	BYPASS No.17
RY(n+1h)7h	23	SEQ SELECT No.8	RY(n+4h)7h	71	BYPASS No.18
RY(n+1h)8h	24	SEQ SELECT No.9	RY(n+4h)8h	72	BYPASS No.19
RY(n+1h)9h	25	SEQ SELECT No.10	RY(n+4h)9h	73	BYPASS No.20
RY(n+1h)Ah	26	SEQ SELECT No.11	RY(n+4h)Ah	74	BYPASS No.21
RY(n+1h)Bh	27	SEQ SELECT No.12	RY(n+4h)Bh	75	BYPASS No.22
RY(n+1h)Ch	28	SEQ SELECT No.13	RY(n+4h)Ch	76	BYPASS No.23
RY(n+1h)Dh	29	SEQ SELECT No.14	RY(n+4h)Dh	77	BYPASS No.24
RY(n+1h)Eh	30	SEQ SELECT No.15	RY(n+4h)Eh	78	BYPASS No.25
RY(n+1h)Fh	31	SEQ SELECT No.16	RY(n+4h)Fh	79	BYPASS No.26
RY(n+2h)0h	32	SEQ SELECT No.17	RY(n+5h)0h	80	BYPASS No.27
RY(n+2h)1h	33	SEQ SELECT No.18	RY(n+5h)1h	81	BYPASS No.28
RY(n+2h)2h	34	SEQ SELECT No.19	RY(n+5h)2h	82	BYPASS No.29
RY(n+2h)3h	35	SEQ SELECT No.20	RY(n+5h)3h	83	BYPASS No.30
RY(n+2h)4h	36	SEQ SELECT No.21	RY(n+5h)4h	84	BYPASS No.31
RY(n+2h)5h	37	SEQ SELECT No.22	RY(n+5h)5h	85	BYPASS No.32
RY(n+2h)6h	38	SEQ SELECT No.23	RY(n+5h)6h	86	Not used
RY(n+2h)7h	39	SEQ SELECT No.24	RY(n+5h)7h	87	Not used
RY(n+2h)8h	40	SEQ SELECT No.25	RY(n+5h)8h	88	Not used
RY(n+2h)9h	41	SEQ SELECT No.26	RY(n+5h)9h	89	Not used
RY(n+2h)Ah	42	SEQ SELECT No.27	RY(n+5h)Ah	90	Not used
RY(n+2h)Bh	43	SEQ SELECT No.28	RY(n+5h)Bh	91	MESSAGE AXIS OFFSET BIT 0
RY(n+2h)Ch	44	SEQ SELECT No.29	RY(n+5h)Ch	92	MESSAGE AXIS OFFSET BIT 1
RY(n+2h)Dh	45	SEQ SELECT No.30	RY(n+5h)Dh	93	MESSAGE AXIS OFFSET BIT 2
RY(n+2h)Eh	46	SEQ SELECT No.31	RY(n+5h)Eh	94	MESSAGE AXIS OFFSET BIT 3
RY(n+2h)Fh	47	SEQ SELECT No.32*	RY(n+5h)Fh	95	MESSAGE AXIS OFFSET BIT 4

*Individual Sequence Select No.1 – No.32 must be enabled by “Sequence Select No. Enable” (Bit11) (Please refer to AFC3000 Operations Manual Section 5-3-2 and 5-3-3 for description of the respective signals)

CC-Link Fieldbus Expansion Unit

Address	BIT	Signal	Address	BIT	Signal
RY(n+6h)0h	96	Not used	?		
RY(n+6h)1h	97	Not used	RY(n+ 37h)0h	880	Reserved by CCLINK
RY(n+6h)2h	98	Not used	RY(n+ 37h)1h	881	Reserved by CCLINK
RY(n+6h)3h	99	Not used	RY(n+ 37h)2h	882	Reserved by CCLINK
RY(n+6h)4h	100	Not used	RY(n+ 37h)3h	883	Reserved by CCLINK
RY(n+6h)5h	101	Not used	RY(n+ 37h)4h	884	Reserved by CCLINK
RY(n+6h)6h	102	Not used	RY(n+ 37h)5h	885	Reserved by CCLINK
RY(n+6h)7h	103	Not used	RY(n+ 37h)6h	886	Reserved by CCLINK
RY(n+6h)8h	104	Not used	RY(n+ 37h)7h	887	Reserved by CCLINK
RY(n+6h)9h	105	Not used	RY(n+ 37h)8h	888	Initial Data setting Complete Flag
RY(n+6h)Ah	106	Not used	RY(n+ 37h)9h	889	Initial Data processing request Flag
RY(n+6h)Bh	107	Not used	RY(n+ 37h)Ah	890	Error reset request Flag
RY(n+6h)Ch	108	Not used	RY(n+ 37h)Bh	891	Not Used
RY(n+6h)Dh	109	Not used	RY(n+ 37h)Ch	892	Reserved by CCLINK
RY(n+6h)Eh	110	Not used	RY(n+ 37h)Dh	893	Reserved by CCLINK
RY(n+6h)Fh	111	Not used	RY(n+ 37h)Eh	894	Reserved by CCLINK
?			RY(n+ 37h)Fh	895	Reserved by CCLINK

CCLINK
Handshaking
Signals



Caution

**The assignment of the input signals is fixed (cannot be changed).
The unassigned area of RY (n+37h) 0h to RY (n+37h) Fh is Reserved by CCLINK
and cannot be used.**

● **AFC3000 CC-Link V2 System Signal Specifications (MASTER Spindle → PLC)**

The table below is an example of the Output mapping using MAXIMUM allowed configuration for CCLINK (4 occupied stations / extended cyclic setting of 8). Output bits (1 to 879) are allowed to be user-programmed using the AFC3000 User Console Software.

The allocation of the signals can be set on any bit/pin through the “PLC Output Layout” function of the AFC3000 User Console Software. Please refer to “PLC Output Layout” of the <<AFC3000 User Console Instruction Manual>> concerning the setting method.

Address	BIT	Signal	Address	BIT	Signal
RX(n+0h)0h	0	TOTAL REJECT	RX(n+2h)0h	32	SEQ SELECT No.17
RX(n+0h)1h	1	TOTAL ACCEPT	RX(n+2h)1h	33	SEQ SELECT No.18
RX(n+0h)2h	2	TOTAL ABNORMAL	RX(n+2h)2h	34	SEQ SELECT No.19
RX(n+0h)3h	3	TOTAL READY	RX(n+2h)3h	35	SEQ SELECT No.20
RX(n+0h)4h	4	TOTAL BUSY	RX(n+2h)4h	36	SEQ SELECT No.21
RX(n+0h)5h	5	END	RX(n+2h)5h	37	SEQ SELECT No.22
RX(n+0h)6h	6	SEQ SELECT BIT 0	RX(n+2h)6h	38	SEQ SELECT No.23
RX(n+0h)7h	7	SEQ SELECT BIT 1	RX(n+2h)7h	39	SEQ SELECT No.24
RX(n+0h)8h	8	SEQ SELECT BIT 2	RX(n+2h)8h	40	SEQ SELECT No.25
RX(n+0h)9h	9	SEQ SELECT BIT 3	RX(n+2h)9h	41	SEQ SELECT No.26
RX(n+0h)Ah	10	SEQ SELECT BIT 4	RX(n+2h)Ah	42	SEQ SELECT No.27
RX(n+0h)Bh	11	SPINDLE IN BYPASS	RX(n+2h)Bh	43	SEQ SELECT No.28
RX(n+0h)Ch	12	DATA AVAILABLE	RX(n+2h)Ch	44	SEQ SELECT No.29
RX(n+0h)Dh	13	CURRENT WARNING	RX(n+2h)Dh	45	SEQ SELECT No.30
RX(n+0h)Eh	14	CAL WARNING	RX(n+2h)Eh	46	SEQ SELECT No.31
RX(n+0h)Fh	15	ZERO LEVEL WARNING	RX(n+2h)Fh	47	SEQ SELECT No.32
RX(n+1h)0h	16	SEQ SELECT No.1	RX(n+3h)0h	48	
RX(n+1h)1h	17	SEQ SELECT No.2	RX(n+3h)1h	49	
RX(n+1h)2h	18	SEQ SELECT No.3	RX(n+3h)2h	50	
RX(n+1h)3h	19	SEQ SELECT No.4	RX(n+3h)3h	51	
RX(n+1h)4h	20	SEQ SELECT No.5	RX(n+3h)4h	52	
RX(n+1h)5h	21	SEQ SELECT No.6	RX(n+3h)5h	53	
RX(n+1h)6h	22	SEQ SELECT No.7	RX(n+3h)6h	54	
RX(n+1h)7h	23	SEQ SELECT No.8	RX(n+3h)7h	55	
RX(n+1h)8h	24	SEQ SELECT No.9	RX(n+3h)8h	56	
RX(n+1h)9h	25	SEQ SELECT No.10	RX(n+3h)9h	57	
RX(n+1h)Ah	26	SEQ SELECT No.11	RX(n+3h)Ah	58	
RX(n+1h)Bh	27	SEQ SELECT No.12	RX(n+3h)Bh	59	MESSAGE AXIS OFFSET BIT 0
RX(n+1h)Ch	28	SEQ SELECT No.13	RX(n+3h)Ch	60	MESSAGE AXIS OFFSET BIT 1
RX(n+1h)Dh	29	SEQ SELECT No.14	RX(n+3h)Dh	61	MESSAGE AXIS OFFSET BIT 2
RX(n+1h)Eh	30	SEQ SELECT No.15	RX(n+3h)Eh	62	MESSAGE AXIS OFFSET BIT 3
RX(n+1h)Fh	31	SEQ SELECT No.16	RX(n+3h)Fh	63	MESSAGE AXIS OFFSET BIT 4

(Please refer to AFC3000 Operations Manual Section 5-3-2 and 5-3-3 for description of the respective signals)

CC-Link Fieldbus Expansion Unit

Address	BIT	Signal	Address	BIT	Signal
RX(n+4h)0h	64	ACCEPT No.1	RX(n+7h)0h	112	REJECT No.17
RX(n+4h)1h	65	ACCEPT No.2	RX(n+7h)1h	113	REJECT No.18
RX(n+4h)2h	66	ACCEPT No.3	RX(n+7h)2h	114	REJECT No.19
RX(n+4h)3h	67	ACCEPT No.4	RX(n+7h)3h	115	REJECT No.20
RX(n+4h)4h	68	ACCEPT No.5	RX(n+7h)4h	116	REJECT No.21
RX(n+4h)5h	69	ACCEPT No.6	RX(n+7h)5h	117	REJECT No.22
RX(n+4h)6h	70	ACCEPT No.7	RX(n+7h)6h	118	REJECT No.23
RX(n+4h)7h	71	ACCEPT No.8	RX(n+7h)7h	119	REJECT No.24
RX(n+4h)8h	72	ACCEPT No.9	RX(n+7h)8h	120	REJECT No.25
RX(n+4h)9h	73	ACCEPT No.10	RX(n+7h)9h	121	REJECT No.26
RX(n+4h)Ah	74	ACCEPT No.11	RX(n+7h)Ah	122	REJECT No.27
RX(n+4h)Bh	75	ACCEPT No.12	RX(n+7h)Bh	123	REJECT No.28
RX(n+4h)Ch	76	ACCEPT No.13	RX(n+7h)Ch	124	REJECT No.29
RX(n+4h)Dh	77	ACCEPT No.14	RX(n+7h)Dh	125	REJECT No.30
RX(n+4h)Eh	78	ACCEPT No.15	RX(n+7h)Eh	126	REJECT No.31
RX(n+4h)Fh	79	ACCEPT No.16	RX(n+7h)Fh	127	REJECT No.32
RX(n+5h)0h	80	ACCEPT No.17	RX(n+8h)0h	128	BYPASS No.1
RX(n+5h)1h	81	ACCEPT No.18	RX(n+8h)1h	129	BYPASS No.2
RX(n+5h)2h	82	ACCEPT No.19	RX(n+8h)2h	130	BYPASS No.3
RX(n+5h)3h	83	ACCEPT No.20	RX(n+8h)3h	131	BYPASS No.4
RX(n+5h)4h	84	ACCEPT No.21	RX(n+8h)4h	132	BYPASS No.5
RX(n+5h)5h	85	ACCEPT No.22	RX(n+8h)5h	133	BYPASS No.6
RX(n+5h)6h	86	ACCEPT No.23	RX(n+8h)6h	134	BYPASS No.7
RX(n+5h)7h	87	ACCEPT No.24	RX(n+8h)7h	135	BYPASS No.8
RX(n+5h)8h	88	ACCEPT No.25	RX(n+8h)8h	136	BYPASS No.9
RX(n+5h)9h	89	ACCEPT No.26	RX(n+8h)9h	137	BYPASS No.10
RX(n+5h)Ah	90	ACCEPT No.27	RX(n+8h)Ah	138	BYPASS No.11
RX(n+5h)Bh	91	ACCEPT No.28	RX(n+8h)Bh	139	BYPASS No.12
RX(n+5h)Ch	92	ACCEPT No.29	RX(n+8h)Ch	140	BYPASS No.13
RX(n+5h)Dh	93	ACCEPT No.30	RX(n+8h)Dh	141	BYPASS No.14
RX(n+5h)Eh	94	ACCEPT No.31	RX(n+8h)Eh	142	BYPASS No.15
RX(n+5h)Fh	95	ACCEPT No.32	RX(n+8h)Fh	143	BYPASS No.16
RX(n+6h)0h	96	REJECT No.1	RX(n+9h)0h	144	BYPASS No.17
RX(n+6h)1h	97	REJECT No.2	RX(n+9h)1h	145	BYPASS No.18
RX(n+6h)2h	98	REJECT No.3	RX(n+9h)2h	146	BYPASS No.19
RX(n+6h)3h	99	REJECT No.4	RX(n+9h)3h	147	BYPASS No.20
RX(n+6h)4h	100	REJECT No.5	RX(n+9h)4h	148	BYPASS No.21
RX(n+6h)5h	101	REJECT No.6	RX(n+9h)5h	149	BYPASS No.22
RX(n+6h)6h	102	REJECT No.7	RX(n+9h)6h	150	BYPASS No.23
RX(n+6h)7h	103	REJECT No.8	RX(n+9h)7h	151	BYPASS No.24
RX(n+6h)8h	104	REJECT No.9	RX(n+9h)8h	152	BYPASS No.25
RX(n+6h)9h	105	REJECT No.10	RX(n+9h)9h	153	BYPASS No.26
RX(n+6h)Ah	106	REJECT No.11	RX(n+9h)Ah	154	BYPASS No.27
RX(n+6h)Bh	107	REJECT No.12	RX(n+9h)Bh	155	BYPASS No.28
RX(n+6h)Ch	108	REJECT No.13	RX(n+9h)Ch	156	BYPASS No.29
RX(n+6h)Dh	109	REJECT No.14	RX(n+9h)Dh	157	BYPASS No.30
RX(n+6h)Eh	110	REJECT No.15	RX(n+9h)Eh	158	BYPASS No.31
RX(n+6h)Fh	111	REJECT No.16	RX(n+9h)Fh	159	BYPASS No.32

CC-Link Fieldbus Expansion Unit

Address	BIT	Signal	Address	BIT	Signal
RX(n+Ah)0h	160	CURRENT WARNING No.1	RX(n+Dh)0h	208	ZERO LEVEL WARNING No.17
RX(n+Ah)1h	161	CURRENT WARNING No.2	RX(n+Dh)1h	209	ZERO LEVEL WARNING No.18
RX(n+Ah)2h	162	CURRENT WARNING No.3	RX(n+Dh)2h	210	ZERO LEVEL WARNING No.19
RX(n+Ah)3h	163	CURRENT WARNING No.4	RX(n+Dh)3h	211	ZERO LEVEL WARNING No.20
RX(n+Ah)4h	164	CURRENT WARNING No.5	RX(n+Dh)4h	212	ZERO LEVEL WARNING No.21
RX(n+Ah)5h	165	CURRENT WARNING No.6	RX(n+Dh)5h	213	ZERO LEVEL WARNING No.22
RX(n+Ah)6h	166	CURRENT WARNING No.7	RX(n+Dh)6h	214	ZERO LEVEL WARNING No.23
RX(n+Ah)7h	167	CURRENT WARNING No.8	RX(n+Dh)7h	215	ZERO LEVEL WARNING No.24
RX(n+Ah)8h	168	CURRENT WARNING No.9	RX(n+Dh)8h	216	ZERO LEVEL WARNING No.25
RX(n+Ah)9h	169	CURRENT WARNING No.10	RX(n+Dh)9h	217	ZERO LEVEL WARNING No.26
RX(n+Ah)Ah	170	CURRENT WARNING No.11	RX(n+Dh)Ah	218	ZERO LEVEL WARNING No.27
RX(n+Ah)Bh	171	CURRENT WARNING No.12	RX(n+Dh)Bh	219	ZERO LEVEL WARNING No.28
RX(n+Ah)Ch	172	CURRENT WARNING No.13	RX(n+Dh)Ch	220	ZERO LEVEL WARNING No.29
RX(n+Ah)Dh	173	CURRENT WARNING No.14	RX(n+Dh)Dh	221	ZERO LEVEL WARNING No.30
RX(n+Ah)Eh	174	CURRENT WARNING No.15	RX(n+Dh)Eh	222	ZERO LEVEL WARNING No.31
RX(n+Ah)Fh	175	CURRENT WARNING No.16	RX(n+Dh)Fh	223	ZERO LEVEL WARNING No.32
RX(n+Bh)0h	176	CURRENT WARNING No.17	RX(n+Ah)0h	224	CAL WARNING No.1
RX(n+Bh)1h	177	CURRENT WARNING No.18	RX(n+Ah)1h	225	CAL WARNING No.2
RX(n+Bh)2h	178	CURRENT WARNING No.19	RX(n+Ah)2h	226	CAL WARNING No.3
RX(n+Bh)3h	179	CURRENT WARNING No.20	RX(n+Ah)3h	227	CAL WARNING No.4
RX(n+Bh)4h	180	CURRENT WARNING No.21	RX(n+Ah)4h	228	CAL WARNING No.5
RX(n+Bh)5h	181	CURRENT WARNING No.22	RX(n+Ah)5h	229	CAL WARNING No.6
RX(n+Bh)6h	182	CURRENT WARNING No.23	RX(n+Ah)6h	230	CAL WARNING No.7
RX(n+Bh)7h	183	CURRENT WARNING No.24	RX(n+Ah)7h	231	CAL WARNING No.8
RX(n+Bh)8h	184	CURRENT WARNING No.25	RX(n+Ah)8h	232	CAL WARNING No.9
RX(n+Bh)9h	185	CURRENT WARNING No.26	RX(n+Ah)9h	233	CAL WARNING No.10
RX(n+Bh)Ah	186	CURRENT WARNING No.27	RX(n+Ah)Ah	234	CAL WARNING No.11
RX(n+Bh)Bh	187	CURRENT WARNING No.28	RX(n+Ah)Bh	235	CAL WARNING No.12
RX(n+Bh)Ch	188	CURRENT WARNING No.29	RX(n+Ah)Ch	236	CAL WARNING No.13
RX(n+Bh)Dh	189	CURRENT WARNING No.30	RX(n+Ah)Dh	237	CAL WARNING No.14
RX(n+Bh)Eh	190	CURRENT WARNING No.31	RX(n+Ah)Eh	238	CAL WARNING No.15
RX(n+Bh)Fh	191	CURRENT WARNING No.32	RX(n+Ah)Fh	239	CAL WARNING No.16
RX(n+Ch)0h	192	ZERO LEVEL WARNING No.1	RX(n+Ah)0h	240	CAL WARNING No.17
RX(n+Ch)1h	193	ZERO LEVEL WARNING No.2	RX(n+Ah)1h	241	CAL WARNING No.18
RX(n+Ch)2h	194	ZERO LEVEL WARNING No.3	RX(n+Ah)2h	242	CAL WARNING No.19
RX(n+Ch)3h	195	ZERO LEVEL WARNING No.4	RX(n+Ah)3h	243	CAL WARNING No.20
RX(n+Ch)4h	196	ZERO LEVEL WARNING No.5	RX(n+Ah)4h	244	CAL WARNING No.21
RX(n+Ch)5h	197	ZERO LEVEL WARNING No.6	RX(n+Ah)5h	245	CAL WARNING No.22
RX(n+Ch)6h	198	ZERO LEVEL WARNING No.7	RX(n+Ah)6h	246	CAL WARNING No.23
RX(n+Ch)7h	199	ZERO LEVEL WARNING No.8	RX(n+Ah)7h	247	CAL WARNING No.24
RX(n+Ch)8h	200	ZERO LEVEL WARNING No.9	RX(n+Ah)8h	248	CAL WARNING No.25
RX(n+Ch)9h	201	ZERO LEVEL WARNING No.10	RX(n+Ah)9h	249	CAL WARNING No.26
RX(n+Ch)Ah	202	ZERO LEVEL WARNING No.11	RX(n+Ah)Ah	250	CAL WARNING No.27
RX(n+Ch)Bh	203	ZERO LEVEL WARNING No.12	RX(n+Ah)Bh	251	CAL WARNING No.28
RX(n+Ch)Ch	204	ZERO LEVEL WARNING No.13	RX(n+Ah)Ch	252	CAL WARNING No.29
RX(n+Ch)Dh	205	ZERO LEVEL WARNING No.14	RX(n+Ah)Dh	253	CAL WARNING No.30
RX(n+Ch)Eh	206	ZERO LEVEL WARNING No.15	RX(n+Ah)Eh	254	CAL WARNING No.31
RX(n+Ch)Fh	207	ZERO LEVEL WARNING No.16	RX(n+Ah)Fh	255	CAL WARNING No.32

CC-Link Fieldbus Expansion Unit

Address	BIT	Signal	Address	BIT	Signal
RX(n+10h)0h	256	REJECT No.1	RX(n+13h)0h	304	TQ HI REJ. No.2
RX(n+10h)1h	257	ACCEPT No.1	RX(n+13h)1h	305	TQ LO REJ. No.2
RX(n+10h)2h	258	ABNORMAL No.1	RX(n+13h)2h	306	FINAL ANG HI REJ. No.2
RX(n+10h)3h	259	READY No.1	RX(n+13h)3h	307	FINAL ANG LO REJ. No.2
RX(n+10h)4h	260	BUSY No.1	RX(n+13h)4h	308	DIFF +ANG REJ. No.2
RX(n+10h)5h	261	BYPASS No.1	RX(n+13h)5h	309	DIFF –ANG REJ. No.2
RX(n+10h)6h	262	PAR SELECT BIT0 (No.1)	RX(n+13h)6h	310	1ST TIME HI REJ. No.2
RX(n+10h)7h	263	PAR SELECT BIT1 (No.1)	RX(n+13h)7h	311	1ST TIME LO REJ. No.2
RX(n+10h)8h	264	PAR SELECT BIT2 (No.1)	RX(n+13h)8h	312	2ND TIME HI REJ. No.2
RX(n+10h)9h	265	PAR SELECT BIT3 (No.1)	RX(n+13h)9h	313	2ND TIME LO REJ. No.2
RX(n+10h)Ah	266	PAR SELECT BIT4 (No.1)	RX(n+13h)Ah	314	RATE1 HI REJ. No.2
RX(n+10h)Bh	267	TQ RECOVERY BUSY No.1	RX(n+13h)Bh	315	RATE1 LO REJ. No.2
RX(n+10h)Ch	268	CURRENT WARNING No.1	RX(n+13h)Ch	316	RATE2 HI REJ. No.2
RX(n+10h)Dh	269	SNUG TQ HI REJ. No.1	RX(n+13h)Dh	317	RATE2 LO REJ. No.2
RX(n+10h)Eh	270	REV. HI REJ. No.1	RX(n+13h)Eh	318	RATE3 HI REJ. No.2
RX(n+10h)Fh	271	REV. LO REJ. No.1	RX(n+13h)Fh	319	RATE3 LO REJ. No.2
RX(n+11h)0h	272	TQ HI REJ. No.1	RX(n+14h)0h	320	REJECT No.3
RX(n+11h)1h	273	TQ LO REJ. No.1	RX(n+14h)1h	321	ACCEPT No.3
RX(n+11h)2h	274	FINAL ANG HI REJ. No.1	RX(n+14h)2h	322	ABNORMAL No.3
RX(n+11h)3h	275	FINAL ANG LO REJ. No.1	RX(n+14h)3h	323	READY No.3
RX(n+11h)4h	276	DIFF +ANG REJ. No.1	RX(n+14h)4h	324	BUSY No.3
RX(n+11h)5h	277	DIFF –ANG REJ. No.1	RX(n+14h)5h	325	BYPASS No.3
RX(n+11h)6h	278	1ST TIME HI REJ. No.1	RX(n+14h)6h	326	PAR SELECT BIT0 (No.3)
RX(n+11h)7h	279	1ST TIME LO REJ. No.1	RX(n+14h)7h	327	PAR SELECT BIT1 (No.3)
RX(n+11h)8h	280	2ND TIME HI REJ. No.1	RX(n+14h)8h	328	PAR SELECT BIT2 (No.3)
RX(n+11h)9h	281	2ND TIME LO REJ. No.1	RX(n+14h)9h	329	PAR SELECT BIT3 (No.3)
RX(n+11h)Ah	282	RATE1 HI REJ. No.1	RX(n+14h)Ah	330	PAR SELECT BIT4 (No.3)
RX(n+11h)Bh	283	RATE1 LO REJ. No.1	RX(n+14h)Bh	331	TQ RECOVERY BUSY No.3
RX(n+11h)Ch	284	RATE2 HI REJ. No.1	RX(n+14h)Ch	332	CURRENT WARNING No.3
RX(n+11h)Dh	285	RATE2 LO REJ. No.1	RX(n+14h)Dh	333	SNUG TQ HI REJ. No.3
RX(n+11h)Eh	286	RATE3 HI REJ. No.1	RX(n+14h)Eh	334	REV. HI REJ. No.3
RX(n+11h)Fh	287	RATE3 LO REJ. No.1	RX(n+14h)Fh	335	REV. LO REJ. No.3
RX(n+12h)0h	288	REJECT No.2	RX(n+15h)0h	336	TQ HI REJ. No.3
RX(n+12h)1h	289	ACCEPT No.2	RX(n+15h)1h	337	TQ LO REJ. No.3
RX(n+12h)2h	290	ABNORMAL No.2	RX(n+15h)2h	338	FINAL ANG HI REJ. No.3
RX(n+12h)3h	291	READY No.2	RX(n+15h)3h	339	FINAL ANG LO REJ. No.3
RX(n+12h)4h	292	BUSY No.2	RX(n+15h)4h	340	DIFF +ANG REJ. No.3
RX(n+12h)5h	293	BYPASS No.2	RX(n+15h)5h	341	DIFF –ANG REJ. No.3
RX(n+12h)6h	294	PAR SELECT BIT0 (No.2)	RX(n+15h)6h	342	1ST TIME HI REJ. No.3
RX(n+12h)7h	295	PAR SELECT BIT1 (No.2)	RX(n+15h)7h	343	1ST TIME LO REJ. No.3
RX(n+12h)8h	296	PAR SELECT BIT2 (No.2)	RX(n+15h)8h	344	2ND TIME HI REJ. No.3
RX(n+12h)9h	297	PAR SELECT BIT3 (No.2)	RX(n+15h)9h	345	2ND TIME LO REJ. No.3
RX(n+12h)Ah	298	PAR SELECT BIT4 (No.2)	RX(n+15h)Ah	346	RATE1 HI REJ. No.3
RX(n+12h)Bh	299	TQ RECOVERY BUSY No.2	RX(n+15h)Bh	347	RATE1 LO REJ. No.3
RX(n+12h)Ch	300	CURRENT WARNING No.2	RX(n+15h)Ch	348	RATE2 HI REJ. No.3
RX(n+12h)Dh	301	SNUG TQ HI REJ. No.2	RX(n+15h)Dh	349	RATE2 LO REJ. No.3
RX(n+12h)Eh	302	REV. HI REJ. No.2	RX(n+15h)Eh	350	RATE3 HI REJ. No.3
RX(n+12h)Fh	303	REV. LO REJ. No.2	RX(n+15h)Fh	351	RATE3 LO REJ. No.3

CC-Link Fieldbus Expansion Unit

Address	BIT	Signal	Address	BIT	Signal
RX(n+16h)0h	352	REJECT No.4	RX(n+19h)0h	400	TQ HI REJ. No.5
RX(n+16h)1h	353	ACCEPT No.4	RX(n+19h)1h	401	TQ LO REJ. No.5
RX(n+16h)2h	354	ABNORMAL No.4	RX(n+19h)2h	402	FINAL ANG HI REJ. No.5
RX(n+16h)3h	355	READY No.4	RX(n+19h)3h	403	FINAL ANG LO REJ. No.5
RX(n+16h)4h	356	BUSY No.4	RX(n+19h)4h	404	DIFF + ANG REJ. No.5
RX(n+16h)5h	357	BYPASS No.4	RX(n+19h)5h	405	DIFF – ANG REJ. No.5
RX(n+16h)6h	358	PAR SELECT BIT0 (No.4)	RX(n+19h)6h	406	1ST TIME HI REJ. No.5
RX(n+16h)7h	359	PAR SELECT BIT1 (No.4)	RX(n+19h)7h	407	1ST TIME LO REJ. No.5
RX(n+16h)8h	360	PAR SELECT BIT2 (No.4)	RX(n+19h)8h	408	2ND TIME HI REJ. No.5
RX(n+16h)9h	361	PAR SELECT BIT3 (No.4)	RX(n+19h)9h	409	2ND TIME LO REJ. No.5
RX(n+16h)Ah	362	PAR SELECT BIT4 (No.4)	RX(n+19h)Ah	410	RATE1 HI REJ. No.5
RX(n+16h)Bh	363	TQ RECOVERY BUSY No.4	RX(n+19h)Bh	411	RATE1 LO REJ. No.5
RX(n+16h)Ch	364	CURRENT WARNING No.4	RX(n+19h)Ch	412	RATE2 HI REJ. No.5
RX(n+16h)Dh	365	SNUG TQ HI REJ. No.4	RX(n+19h)Dh	413	RATE2 LO REJ. No.5
RX(n+16h)Eh	366	REV. HI REJ. No.4	RX(n+19h)Eh	414	RATE3 HI REJ. No.5
RX(n+16h)Fh	367	REV. LO REJ. No.4	RX(n+19h)Fh	415	RATE3 LO REJ. No.5
RX(n+17h)0h	368	TQ HI REJ. No.4	RX(n+1Ah)0h	416	REJECT No.6
RX(n+17h)1h	369	TQ LO REJ. No.4	RX(n+1Ah)1h	417	ACCEPT No.6
RX(n+17h)2h	370	FINAL ANG HI REJ. No.4	RX(n+1Ah)2h	418	ABNORMAL No.6
RX(n+17h)3h	371	FINAL ANG LO REJ. No.4	RX(n+1Ah)3h	419	READY No.6
RX(n+17h)4h	372	DIFF + ANG REJ. No.4	RX(n+1Ah)4h	420	BUSY No.6
RX(n+17h)5h	373	DIFF – ANG REJ. No.4	RX(n+1Ah)5h	421	BYPASS No.6
RX(n+17h)6h	374	1ST TIME HI REJ. No.4	RX(n+1Ah)6h	422	PAR SELECT BIT0 (No.6)
RX(n+17h)7h	375	1ST TIME LO REJ. No.4	RX(n+1Ah)7h	423	PAR SELECT BIT1 (No.6)
RX(n+17h)8h	376	2ND TIME HI REJ. No.4	RX(n+1Ah)8h	424	PAR SELECT BIT2 (No.6)
RX(n+17h)9h	377	2ND TIME LO REJ. No.4	RX(n+1Ah)9h	425	PAR SELECT BIT3 (No.6)
RX(n+17h)Ah	378	RATE1 HI REJ. No.4	RX(n+1Ah)Ah	426	PAR SELECT BIT4 (No.6)
RX(n+17h)Bh	379	RATE1 LO REJ. No.4	RX(n+1Ah)Bh	427	TQ RECOVERY BUSY No.6
RX(n+17h)Ch	380	RATE2 HI REJ. No.4	RX(n+1Ah)Ch	428	CURRENT WARNING No.6
RX(n+17h)Dh	381	RATE2 LO REJ. No.4	RX(n+1Ah)Dh	429	SNUG TQ HI REJ. No.6
RX(n+17h)Eh	382	RATE3 HI REJ. No.4	RX(n+1Ah)Eh	430	REV. HI REJ. No.6
RX(n+17h)Fh	383	RATE3 LO REJ. No.4	RX(n+1Ah)Fh	431	REV. LO REJ. No.6
RX(n+18h)0h	384	REJECT No.5	RX(n+1Bh)0h	432	TQ HI REJ. No.6
RX(n+18h)1h	385	ACCEPT No.5	RX(n+1Bh)1h	433	TQ LO REJ. No.6
RX(n+18h)2h	386	ABNORMAL No.5	RX(n+1Bh)2h	434	FINAL ANG HI REJ. No.6
RX(n+18h)3h	387	READY No.5	RX(n+1Bh)3h	435	FINAL ANG LO REJ. No.6
RX(n+18h)4h	388	BUSY No.5	RX(n+1Bh)4h	436	DIFF + ANG REJ. No.6
RX(n+18h)5h	389	BYPASS No.5	RX(n+1Bh)5h	437	DIFF – ANG REJ. No.6
RX(n+18h)6h	390	PAR SELECT BIT0 (No.5)	RX(n+1Bh)6h	438	1ST TIME HI REJ. No.6
RX(n+18h)7h	391	PAR SELECT BIT1 (No.5)	RX(n+1Bh)7h	439	1ST TIME LO REJ. No.6
RX(n+18h)8h	392	PAR SELECT BIT2 (No.5)	RX(n+1Bh)8h	440	2ND TIME HI REJ. No.6
RX(n+18h)9h	393	PAR SELECT BIT3 (No.5)	RX(n+1Bh)9h	441	2ND TIME LO REJ. No.6
RX(n+18h)Ah	394	PAR SELECT BIT4 (No.5)	RX(n+1Bh)Ah	442	RATE1 HI REJ. No.6
RX(n+18h)Bh	395	TQ RECOVERY BUSY No.5	RX(n+1Bh)Bh	443	RATE1 LO REJ. No.6
RX(n+18h)Ch	396	CURRENT WARNING No.5	RX(n+1Bh)Ch	444	RATE2 HI REJ. No.6
RX(n+18h)Dh	397	SNUG TQ HI REJ. No.5	RX(n+1Bh)Dh	445	RATE2 LO REJ. No.6
RX(n+18h)Eh	398	REV. HI REJ. No.5	RX(n+1Bh)Eh	446	RATE3 HI REJ. No.6
RX(n+18h)Fh	399	REV. LO REJ. No.5	RX(n+1Bh)Fh	447	RATE3 LO REJ. No.6

CC-Link Fieldbus Expansion Unit

Address	BIT	Signal	Address	BIT	Signal			
RX(n+1Ch)0h	448	REJECT No.7	}					
RX(n+1Ch)1h	449	ACCEPT No.7						
RX(n+1Ch)2h	450	ABNORMAL No.7						
}								
RX(n+35h)Dh	861	RATE2 LO REJ. No.19						
RX(n+35h)Eh	862	RATE3 HI REJ. No.19						
RX(n+35h)Fh	863	RATE3 LO REJ. No.19						
RX(n+36h)0h	864					RX(n+37h)0h	880	Reserved by CCLINK
RX(n+36h)1h	865					RX(n+37h)1h	881	Reserved by CCLINK
RX(n+36h)2h	866					RX(n+37h)2h	882	Reserved by CCLINK
RX(n+36h)3h	868		RX(n+37h)3h	883	Reserved by CCLINK			
RX(n+36h)4h	869		RX(n+37h)4h	884	Reserved by CCLINK			
RX(n+36h)5h	870		RX(n+37h)5h	885	Reserved by CCLINK			
RX(n+36h)6h	871		RX(n+37h)6h	886	Reserved by CCLINK			
RX(n+36h)7h	872		RX(n+37h)7h	887	Reserved by CCLINK			
RX(n+36h)8h	873		RX(n+37h)8h	888	Initial Data Processing request Flag			
RX(n+36h)9h	874		RX(n+37h)9h	889	Initial Data setting complete Flag			
RX(n+36h)Ah	875		RX(n+37h)Ah	890	Error Status Flag			
RX(n+36h)Bh	876		RX(n+37h)Bh	891	Remote Ready			
RX(n+36h)Ch	877		RX(n+37h)Ch	892	Reserved by CCLINK			
RX(n+36h)Dh	877		RX(n+37h)Dh	893	Reserved by CCLINK			
RX(n+36h)Eh	878		RX(n+37h)Eh	894	Reserved by CCLINK			
RX(n+36h)Fh	879		RX(n+37h)Fh	895	Reserved by CCLINK			

CCLINK
Handshaking
Signals

* The blank areas above can be programmed as desired and are useable outputs. (Remember, the above mapping is only an example. Output signals are user-programmable on any output bit)

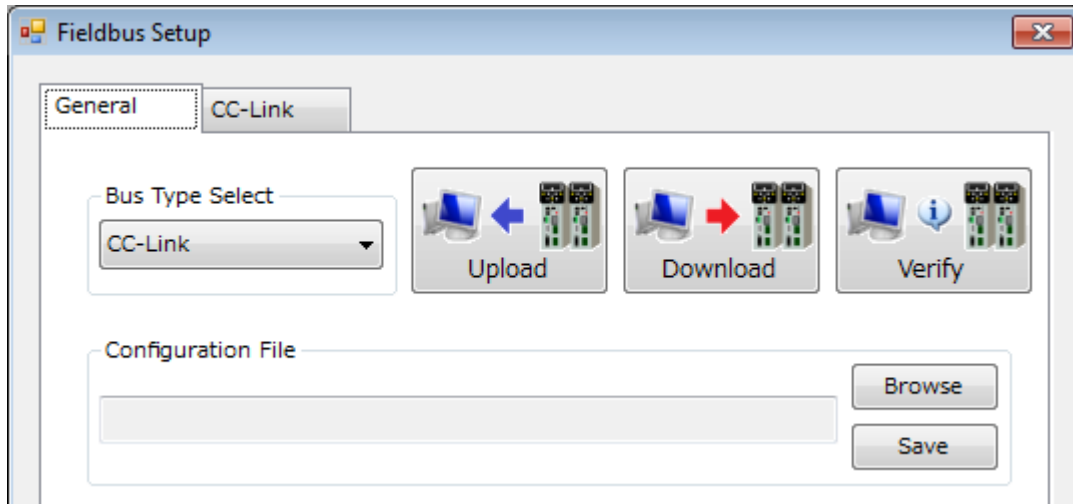
Please refer to AFC3000 Operation Manual, Section 5-3-4 and 5-3-5 for description of the respective signals.

The unused area of RX (n+37h) 0h to RX (n+37h) Fh is RESERVED by CCLINK and cannot be used.

Fieldbus Setting (CC-Link)

The fieldbus settings are set in the “Fieldbus Setting” menu of the AFC3000 User Console. The following setting window is displayed when “Multi” → “Fieldbus Setting” is selected at the menu bar.

In the Bus Type Select/communication window, selection of the fieldbus type, uploading, downloading, and verification of fieldbus settings with respect to the Controller, and browsing and saving of fieldbus settings with respect to the PC can be performed.



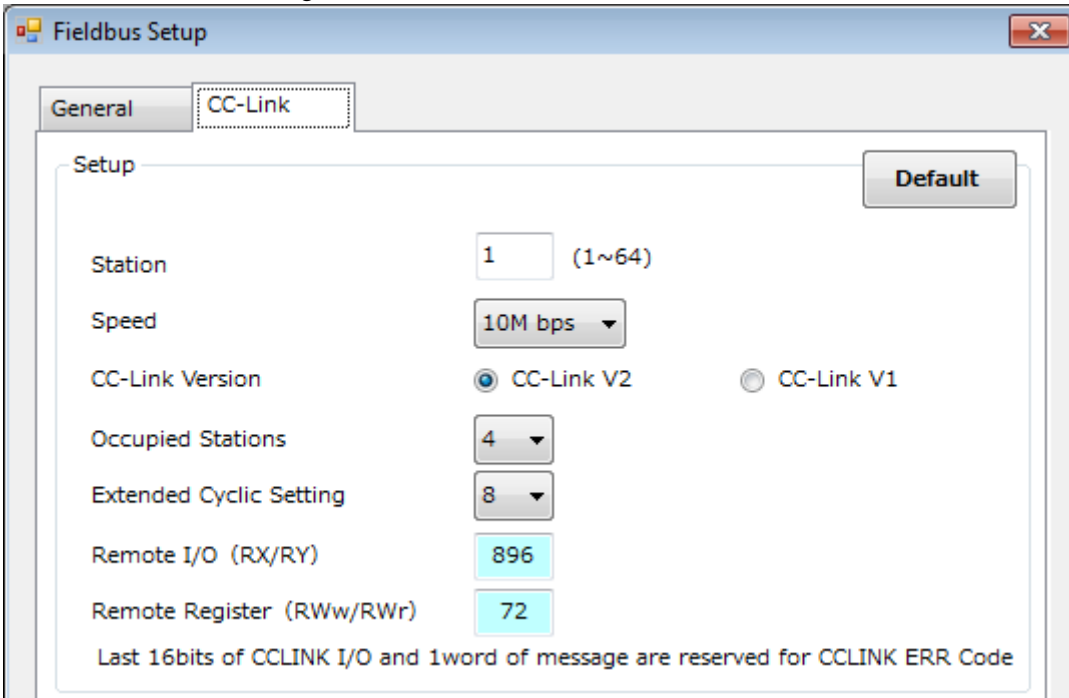
Caution

- **The standard set values are set as the factory settings in the Unit. Do not change the settings unless there is a special reason.**
- **Be sure to perform backup before changing the fieldbus settings of the Controller.**

- **Bus Type Select:** The type of bus is selected from the list. Also, when "Upload" is executed, the bus type is judged automatically and reflected in the selection part.
- **Configuration File**
 - **Browse:** A fieldbus configuration file (*.nrpcf) is read from the PC.
 - **Save:** A fieldbus configuration file (*.nrpcf) is saved in the PC.
- **Upload:** The fieldbus settings are read from the MASTER Spindle for PC communication and I/O (PLC) control.
- **Download:** The fieldbus settings are written into the MASTER Spindle for PC communication and I/O (PLC) control. (Re-activate the control power after writing.)
- **Verify:** The fieldbus settings of the MASTER Spindle for PC communication and I/O (PLC) control and the fieldbus settings in the User Console are compared.

CC-Link Fieldbus Expansion Unit

In the CC-Link window, setting of the Anybus-CompactCom CC-Link interface is performed. The station No., the communication speed, the number of occupied stations, the extended cyclic setting, and the CC-Link version can be changed.



- Default (the settings are set to the factory settings when this is selected)
 - Station No.: 1
 - Communication Speed: 10Mbps
 - Occupied Stations: 4 stations (in common with CC-Link V2 and CC-Link V1)
 - Extended Cyclic Setting: 8 times (CC-Link V2), 1 time (CC-Link V1)
 - * **The message block data length is fixed at 144 bytes.**
- Station No.
 - Setting range: 1 to 64. However, if the occupied stations is set other than 1 station, the maximum station number will be limited to 61 for 4 occupied station, 62 for 3 occupied stations, and 63 for 2 occupied stations.
- Communication Speed: 10Mbps
 - Setting range: 156kbps, 625kbps, 2.5Mbps, 5Mbps, 10Mbps
- CC-Link Version Select
 - Setting range: CC-Link V2, CC-Link V1
- The number of occupied Stations
 - Setting range: 1 station, 2 stations, 3 stations, 4 stations (* fixed at 4 station with CC-Link V1)
- Extended Cyclic Setting
 - Setting range: 1, 2, 4 or 8 extended cycles (* fixed at 1 time with CC-Link V1)
- The Number of Input/Output Points (RX/Ry)
- The Number of Register Words (RWw/RWr)
 - Can be set in accordance with the combination of the extended cyclic setting and the number of occupied stations.

Fieldbus Message Setting (MASTER Spindle → PLC)

The message information output from the MASTER Spindle for PC communication and I/O (PLC) control is set in the AFC3000 User Console software. The maximum size of the message output that can be handled differs according to the number of occupied stations and the extended cyclic setting among the fieldbus settings.

The order of output of the message information is: “Multi Format Data” → “Spindle format data of Spindle No. 1” → “Spindle format data of Spindle No. 2” → … → “Spindle format data of Spindle No. 32.”


Please contact the PLC manufacturer regarding the setting at the PLC side.

- Multi Format Output Items (BCD Format)

Output Items	Number of Bytes	Fastening Data	Multi Format							MSB (16word)
			LSB (1word)		PLC Input Data					
Date	4	2013/5/28	20	13	13	28	-	-	-	-
Time	4	12:34:56	12	34	56	00	-	-	-	-
ID *1	32	ABCDEF	A	B	C	D	E	F	NUL	NUL
SEQ No. (1 to 32)	2	2	00	02	-	-	-	-	-	-
SEQ Judgment *2	2	REJECT	00	01	-	-	-	-	-	~
		ACCEPT	00	02	-	-	-	-		
		ABNORMAL	00	04	-	-	-	-		
		STOP	00	08	-	-	-	-		
		RESET STOP	00	10	-	-	-	-		
		BYPASS	00	20	-	-	-	-		
		START OFF	00	40	-	-	-	-		
		IN CYCLE	00	80	-	-	-	-		
SEQ Cycle Count	4	123456	00	12	34	56	-	-	-	

*1: The ID is fixed at 32 bytes (16 words) and is output in ASCII format. NULL letters are set as unset values.

*2: Please refer to the AFC3000 Operation Manual, “Sequence Judgment” regarding the details of SEQ Judgment.

 Caution	<p>• Do not use the following characters when inputting the ID data.</p> <p>“\”: backslash (yen mark), “/”: slash, “.”: colon, “*”: asterisk, “?”: question mark, “” : double quotation, “<” “>”: inequality signs, “ ”: pipe sign</p>
--	--


●Multi Format Output Items (ASCII Format)

Output Items	Number of Bytes	Fastening Data	Multi Format											
			PLC Input Data "Letter String"											
Date	10	2013/5/28	2	0	1	3	/	0	5	/	2	8	~	
Time	8	12:34:56	1	2	:	3	4	:	5	6				
ID*1	32	ABCDEF	A	B	C	D	E	F	NUL	NUL	NUL	NUL		NUL
SEQ No. (1 to 32)	2	2	␣	2										
SEQ Judgment *2, *3	4	REJECT	R	E	J	␣								
		ACCEPT	A	C	C	␣								
		ABNORMAL	A	B	N	␣								
		STOP	S	T	O	P								
		RESET STOP	R	S	T	␣								
		BYPASS	B	Y	P	␣								
		START OFF	S	O	F	F								
IN CYCLE	I	N	C	Y										
SEQ Cycle Count	8	123456	␣	␣	1	2	3	4	5	6				

*1: The number of output bytes of the ID is fixed at 32 bytes (16 words). NULL letters are set as unset values.

*2: Please refer to the AFC3000 Operation Manual, "Sequence Judgment" regarding the details of SEQ Judgment.

*3: ␣ (20H) is the space code (space).



Caution

Do not use the following characters when inputting the ID data.

“\”: backslash (yen mark), “/”: slash,
 “.”: colon, “*”: asterisk, “?”: question mark,
 “” : double quotation, “<” “>”: inequality signs, “|”: pipe sign

CC-Link Fieldbus Expansion Unit

- Spindle Format Output Items (BCD Format)

Output Items	Number of Bytes	Fastening Data	Spindle format			
			LSB (1word)		MSB (2 word)	
Spindle No. (1 to 32)	2	1	00	01	-	-
PAR No. (1 to 32)	2	2	00	02	-	-
Spindle Judgment*1	4		①	②	③	④
Spindle Cycle Count (8 digits)	4	123456	00	12	34	56
TOOL Cycle Count (8 digits)	4	12345678	12	34	56	78
Peak Torque*2	4	12.34	00	12	34	02
Final Torque*2	4	12.34	00	12	34	02
Snug Torque*2	4	5.67	00	05	67	02
1st Peak Torque*2	4	12.34	00	12	34	02
2nd Peak Torque*2	4	12.34	00	12	34	02
Final Angle*2	4	123.4	00	12	34	01
Differential Angle*2	4	-12.3	00	01	23	11
Rate 1*2	4	1.234	00	12	34	03
Rate 1 Increment Torque*2	4	12.34	00	12	34	02
Rate 1 Increment Angle*2	4	123.4	00	12	34	01
Rate 2*2	4	-0.123	00	01	23	13
Rate 2 Increment Torque*2	4	12.34	00	12	34	02
Rate 2 Increment Angle*2	4	123.4	00	12	34	01
Rate 3*2	4	0.123	00	01	23	03
Rate 3 Increment Torque*2	4	12.34	00	12	34	02
Rate 3 Increment Angle*2	4	123.4	00	12	34	01
1st Time*2	4	123.456	12	34	56	03
2nd Time*2	4	123.456	12	34	56	03
Cycle Time*2	4	654.321	65	43	21	03
Peak Current*2	4	12.3	00	01	23	01
Angle at Peak Torque*2	4	123.4	00	12	34	01
Rundown Revolutions*2	4	12.34	00	12	34	02
ZERO Voltage*2	4	-0.123	00	12	34	13
CAL Voltage*2	4	3.512	00	35	12	03
Spindle Cycle Count (4 digits)*3	2	<u>1234</u> 56	01	23	-	-
TOOL Cycle Count (4 digits)*3	2	<u>1234</u> 5678	23	45	-	-
Load rate	2	20	00	20		

*1: In regard to the Spindle Judgment, “Judgment Data 1” is output as ①, “Judgment Data 2” is output as ②, “Error Data” is output as ③, and “1st NG Item” is output as ④. The values output as ①, ②, and ③ are respectively set by bit allocation from “Fieldbus Message Setting” of the AFC3000 User Console.

*2: With each of the output items (besides “Spindle No.,” “Parameter No.,” “Spindle Judgment,” “Spindle Cycle Count (8 digits · 4 digits),” “Tool Cycle Count (8 digits · 4 digits),” and “Load rate”), the results are output in the order of: the data up to a maximum of 6 digits (without the decimal point) in 2 words (4 bytes), sign, and number of digits to the right of the decimal point.

12 34 **56 0 2**

①②

① Sign

Indication	Details
0	+ value
1	- value

② Number of Digits right of the Decimal Point

Indication	Details
0	No digits right of decimal point
1	1 digit right of the decimal point
2	2 digits right of the decimal point
3	3 digits right of the decimal point
4	4 digits right of the decimal point
5	5 digits right of the decimal point

*3: With each of “Spindle Cycle Count (4 digits)” and “Tool Cycle Count (4 digits),” numerical values of the millions, hundred thousands, ten thousands, and thousands places are output as 4-digit BCD data. Once the cycle count reaches 9,999,999 (99 99BCD), the next number (10,000,000) is output as (00 00BCD).

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● Spindle Format Output Items (ASCII Format)

Output Items	Number of Bytes	Fastening Data	Spindle format									
			1 word	2 word	3 word	4 word		5 word				
Spindle No. (1 to 32)*1	2	1	—	1								
PAR No. (1 to 32)	2	2	—	2								
Spindle Judgment*2	4		①	②	③	④						
Spindle Cycle Count (8 digits)	8	123456	—	—	1	2	3	4	5	6		
TOOL Cycle Count (8 digits)	8	1234567 8	1	2	3	4	5	6	7	8		
Peak Torque*3	8	12.34	—	1	2	.	3	4	Judgment	Occurrence		
Final Torque*3	8	12.34	—	1	2	.	3	4	Judgment	Occurrence		
Snug Torque*3	8	5.67	—	—	5	.	6	7	Judgment	Occurrence		
1st Peak Torque	6	12.34	—	1	2	.	3	4				
2nd Peak Torque	6	12.34	—	1	2	.	3	4				
Final Angle*3	8	123.4	—	1	2	3	.	4	Judgment	Occurrence		
Differential Angle*3	8	-12.3	-	—	1	2	.	3	Judgment	Occurrence		
Rate 1*3	10	1.234	—	—	1	.	2	3	4	Judgment	Occurrence	—
Rate 1 Increment Torque	6	12.34	—	1	2	.	3	4				
Rate 1 Increment Angle	6	123.4	—	1	2	3	.	4				
Rate 2*3	10	-0.123	-	—	0	.	1	2	3	Judgment	Occurrence	—
Rate 2 Increment Torque	6	12.34	—	1	2	.	3	4				
Rate 2 Increment Angle	6	123.4	—	1	2	3	.	4				
Rate 3*3	10	0.123	—	—	0	.	1	2	3	Judgment	Occurrence	—
Rate 3 Increment Torque	6	12.34	—	1	2	.	3	4				
Rate 3 Increment Angle	6	123.4	—	1	2	3	.	4				
1st Time*3	10	123.456	1	2	3	.	4	5	6	Judgment	Occurrence	—
2nd Time*3	10	123.456	1	2	3	.	4	5	6	Judgment	Occurrence	—
Cycle Time*3	8	654.321	6	5	4	.	3	2	1	—		
Peak Current*3	10	12.3	—	—	—	—	1	2	.	3	Warning	—
Angle at Peak Torque	6	123.4	—	1	2	3	.	4				
Rundown Revolutions*3	8	12.34	1	2	.	3	4	Judgment	Occurrence	—		
ZERO Voltage	6	-0.123	-	0	.	1	2	3				
CAL Voltage	6	3.512	—	3	.	5	1	2				
Spindle Cycle Count (4 digits)*4	4	123456	—	1	2	3						
TOOL Cycle Count (4 digits)*4	4	1234567 8	2	3	4	5						
Load rate	4	20	—	—	2	0						

*1: (20H) is the space code (space).

*2: In regard to the Spindle Judgment, “Judgment Data 1” is output as ①, “Judgment Data 2” is output as ②, “Error Data” is output as ③, and “1st NG Item” is output as ④. The values output as ①, ②, and ③ are respectively set by bit allocation from “Fieldbus Message Setting” of the AFC3000 User Console.

*3: With each of the output items in which there are set values of high and low limits, the results are output in the order of: sign, result data (including the decimal point), judgment code, and 1st Reject (failure) item. Items besides the differential angle and rates 1 - 3, ① is not output, and for peak current, ③ is not output.

‘ - 123.5L X ’
 ① ②③

① Sign

Indication	Details
Space (20H)	+ value
- (2DH)	- value

② Judgment Code

Indication	Details
Space (20H)	Within high and low limit, no warning (peak current)
H (48H)	Outside high limit, high limit warning (peak current)
L (4CH)	Outside low limit, low limit warning (peak current)

③ 1st Reject Item

Indication	Details
X (58H)	1st Reject item
Space (20H)	Reject item besides the 1st Reject

*4: The “Spindle Cycle Count (4 digits)” and “Tool Cycle Count (4 digits),” numerical values of the millions, hundred thousands, ten thousands, and thousands places are output as 4-digit BCD data. Once the cycle count reaches 9,999,999 (99 99BCD), the next number (10,000,000) is output as (00 00BCD).

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- Judgment Data 1 and 2 Items (in common with BCD and ASCII)

The Judgment data and the Abnormal data of the operation results are set by bit allocation. In regard to the setting method, please refer to “Fieldbus Message Setting” in the <<AFC3000 User Console Instruction Manual>>.

Classification	Item	Details
Logic	-	Message information to be output by a combination of OR and AND is set.
Spindle Judgment	REJECT	This is output when a fastening result falls outside a judgment range.
	ACCEPT	This is output when fastening ends with the fastening results being within the judgment ranges.
	ABNORMAL	This is output when an error occurs in the system or during the fastening operation.
	BYPASS	This is output when the BYPASS signal is set to “ON” at the start of fastening or during the fastening process.
	STOP	This is output when the STOP signal is set to “OFF” at the start of fastening or during the fastening process.
	RESET STOP	This is output when the RESET signal is set to “ON” at the start of fastening or during the fastening process.
	START OFF	This is output when the START signal is set to “OFF” during the fastening operation with “Deadman” being set as the start method in the sequence setup.
Fastening NG Items	Torque NG	Peak torque low limit NG/peak torque high limit NG
		Final torque low limit NG/final torque high limit NG
		Snug torque high limit NG
		Start torque inhibit high limit NG
	Angle NG	Final angle low limit NG/final angle high limit NG
		Differential - angle NG/Differential + angle NG
Rate NG	Rate 1 low limit NG/Rate 1 high limit NG	
	Rate 2 low limit NG/Rate 2 high limit NG	
	Rate 3 low limit NG/Rate 3 high limit NG	
Time NG	1st time low limit NG/1st time high limit NG	
	2nd time low limit NG/2nd time high limit NG	
Rundown revolutions	Rundown revolution high limit NG/rundown revolution low limit NG	
Current Value Warnings	Low current value limit warning/high current value limit warning	
Auxiliary Information Signal	Judgment Combination Bits 1 to 8	Allows the configuration of multiple REJECT items to be combined onto single outputs (8 combination outputs available). The configuration of these signals is set using the AFC3000 Software (Fieldbus Message Setup Screen).

- Abnormal Data Items (in common with BCD and ASCII)

Abnormal State No.	Details
Abnormal State 1	Torque transducer error
Abnormal State 3	Preamplifier error
Abnormal State 4	System memory error
Abnormal State 5	Servo apply error
Abnormal State 6	Servo type error
Abnormal State 8	Servo amplifier error
Abnormal State 9	Setting data error
Abnormal State 10	Multi signal error

- 1st Reject (Failure) Item (in common with BCD and ASCII)

Identifies the reason or cause for a fastening that is stopped / interrupted BEFORE reaching the target torque (or angle) due to a Reject (outside of the programmed limits). (Some programmed limits can cause the fastening process to stop due to a Reject prior to fastening completion)

Example: A cycle run with a missing fastener will cause a '1ST Time High Limit Reject'. A fastener that reached the Final Angle High Limit setting before reaching Standard Torque will cause a 'Final Angle High Limit reject'.

Note: If the fastening reaches the end of the fastening cycle and rejects, no data will be reported in this data item.

The BCD output format data is shown below for each type of reject item.

Item	Output Format (BCD Format)
No REJECT	00
Peak torque high limit REJECT	01
Final torque high limit REJECT	03
Final angle high limit REJECT	05
Rate 1 high limit REJECT	09
Rate 1 low limit REJECT	10
Rate 2 high limit REJECT	11
Rate 2 low limit REJECT	12
Rate 3 high limit REJECT	13
Rate 3 low limit REJECT	14
1st time high limit REJECT	15
2nd time high limit REJECT	17
Rundown revolution high limit REJECT	19
Snug torque high limit REJECT	21
Start torque inhibit high limit REJECT	22

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- Fastening Judgment Data Output Items: Example of Spindle Judgment Output Data 1 & 2 (common with BCD and ASCII format)

The spindle fastening judgment (from a performed fastening cycle) is set by bit allocation of these 2 data bytes. These judgment status bits are set at the end of a completed fastening cycle.

Note: *Actual Bit configuration is set using the AFC3000 software in the 'Fieldbus Message Setup' screen – Actual bit placement may differ than what is shown.*

- Judgment data setting (example from AFC3000 software)

Item	Judgment Data 2 (BIT)								Judgment Data 1 (BIT)							
	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
Logic	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR	OR
ACCEPT																○
REJECT															○	
ABNORMAL														○		
BYPASS													○			
STOP												○				
RESET STOP											○					
Peak Torque High Limit NG							○									
Peak Torque Low Limit NG						○										
Final Torque High Limit NG						○										
Final Torque Low Limit NG					○											
Final Angle High Limit NG				○												
Final Angle Low Limit NG			○													
?																

- Error Data Setting

The error data of Spindle judgment is set by bit allocation of 1 byte. The data corresponds to the abnormal state No. when an error occurs.

Item	Error (Abnormal) Data BIT							
	7	6	5	4	3	2	1	0
Abnormal state 1 (Torque Transducer)								○
Abnormal state 3 (Preamplifier)							○	
Abnormal state 4 (System Memory)						○		
Abnormal state 5 (Servo Amp Reply)					○			
Abnormal state 6 (Servo Type)				○				
Abnormal state 8 (Servo Amp)			○					
Abnormal state 9 (Parameter)		○						
Abnormal state 10 (Multi Signal)	○							

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- Example 1: Spindle judgment is “ACCEPT” (Using setup of Judgment data from previous page)

Output Item	1word		2word	
	① Judgment Data 1	② Judgment Data 2	③ Error Data	④ Occurring Fastening NG
Spindle Judgment	01	00	00	00

- Example 2: Spindle judgment is “REJECT”: “Final Torque Low Limit NG”

Output Item	1word		2word	
	① Judgment Data 1	② Judgment Data 2	③ Error Data	④ Occurring Fastening NG
Spindle Judgment	02	08	00	04

- Example 3: Spindle judgment is “ABN3-3”

Output Item	1word		2word	
	① Judgment Data 1	② Judgment Data 2	③ Error Data	④ Occurring Fastening NG
Spindle Judgment	04	00	02	00

- Example 4: Spindle judgment is “REJECT”: “Peak Torque Low Limit NG”

出力項目	1word		2word	
	① Judgment Data 1	② Judgment Data 2	③ Abnormal Data	④ 1st NG Item
Spindle Judgment	02	02	00	02

Also, if the fieldbus message is unset, the following contents are output.

Data Format	Output Item	Number of Bytes
BCD Format	Spindle cycle count (4 digits)	2bytes
	Tool cycle count (4 digits)	2bytes

For each of the cycle counts, numerical values of the millions, hundred thousands, ten thousands, and thousands places are output as 4-digit BCD data. Once the cycle count reaches 9,999,999 (99 99BCD), the next number (10,000,000) is output as (0000BCD).

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In the case of a 32-spindle system, the total length of the message data is 64 words (128 bytes).

• Fieldbus Message Output Example (when not set)

Format				
Spindle No.	Output Item	Result Output	PLC Output	
1	Spindle cycle count	1234	D1000	00 01
	Tool cycle count	12345	D1001	00 12
2	Spindle cycle count	123456	D1002	01 23
	Tool cycle count	1234567	D1003	12 34
?	?	?	?	?
32	Spindle cycle count	12345678	D1062	23 45
	Tool cycle count	20000678	D1063	00 00

• Message Information Output Example (Multi Format)

Multi Format					
Output Item	Result Output	PLC Input (BCD Format)		PLC Input (ASCII Format)	
Sequence Cycle Count	216	D1000	00 00	D1000 to D1007	'____216'
		D1001	02 16		
Date	2013-06-21	D1002	20 13	D1008 to D1017	'2013-06-21'
		D1003	06 21		
Time	10:23:36	D1004	10 23	D1018 to D1025	'10:23:36'
		D1005	36 00		
Sequence Judgment	REJECT	D1006	00 01	D1026 to D1029	'REJ_'
Sequence No.	1	D1007	00 01	D1030 to D1031	'_1'
?	?	?	?	?	
Final Message Information Area (when 4 stations and 8 times are set)		D1071		D1071	

* (20H) is the space code (space).

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● Message Information Output Example (Spindle Format)

Spindle Format						
Spindle No.	Output Item	Result Output	PLC Input (BCD Format)		PLC Input (ASCII Format)	
1	Peak Torque [N·m]	12.34	D1000	00 12	D1000 to D1007	'_12.34_'
			D1001	34 02		
	Final Torque [N·m]	12.34	D1002	00 12	D1008 to D1015	'_12.34_'
			D1003	34 02		
	Final Angle [deg]	123.4	D1004	00 12	D1016 to D1023	'_123.4HX'
			D1005	34 01		
	Rate 1 [N·m/deg]	1.234	D1006	00 12	D1024 to D1033	'_1.234_'
			D1007	34 03		
Rate 2 [N·m/deg]	5.678	D1008	00 56	D1034 to D1043	'_5.678_'	
		D1009	78 03			
Rate 3 [N·m/deg]	9.012	D1010	00 90	D1044 to D1053	'_9.012_'	
		D1011	12 03			
1st Time [sec]	12.345	D1012	01 23	D1054 to D1063	'_12.345_'	
		D1013	45 03			
2nd Time [sec]	6.789	D1014	00 67			
		D1015	89 03			
2	Peak Torque [N·m]	23.45	D1016	00 23		
			D1017	45 02		
?	?	?	?	?		
3	Peak Torque [N·m]	34.56	D1032	00 34		
			D1033	56 02		
?	?	?	?	?		
4	Peak Torque [N·m]	45.67	D1048	00 45		
			D1049	67 02		
?	?	?	?	?		
	Free area		D1064		D1064	
?	?	?	?	?		
	Final Message Information Area (when 4 stations and 8 times are set)		D1071		D1071	

* (20H) is the space code (space).

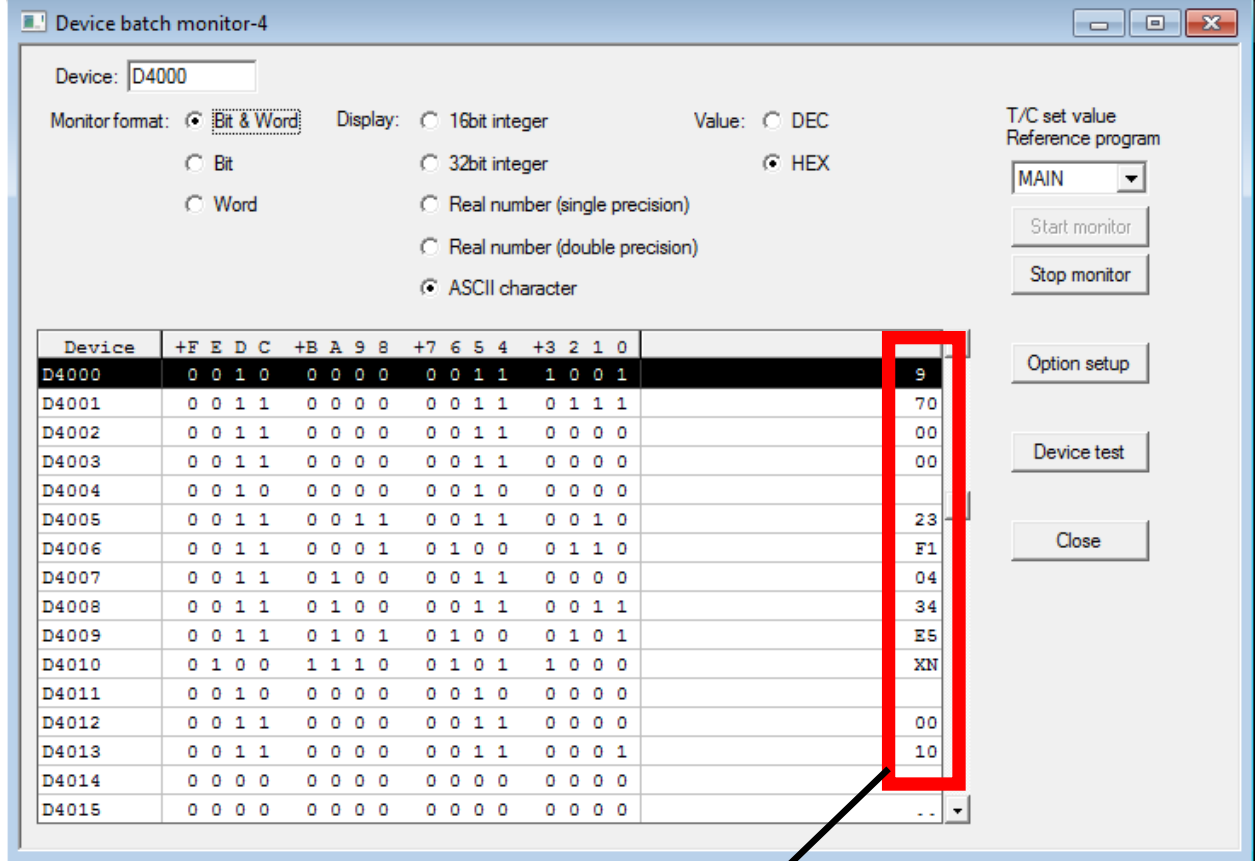
Fieldbus Message Setting (PLC → MASTER Spindle)

1. Contents of Sent Data: ASCII Data
(Refer to 3 below regarding the actual sent data results.)
2. Number of Stations Occupied:
4 stations occupied; size per station in the case of 8 cyclic cycle setting: 71 words (142 bytes)
3. Input Example
Select ASCII letters to send message information from the PLC to the MASTER Spindle for PC communication and I/O (PLC) control.
The message information sent from the PLC to the MASTER Spindle for PC communication and I/O (PLC) control is reflected in the fieldbus communication, the AFC3000 User Console Software, the Controller RS232C port, and the expansion RS232C port.

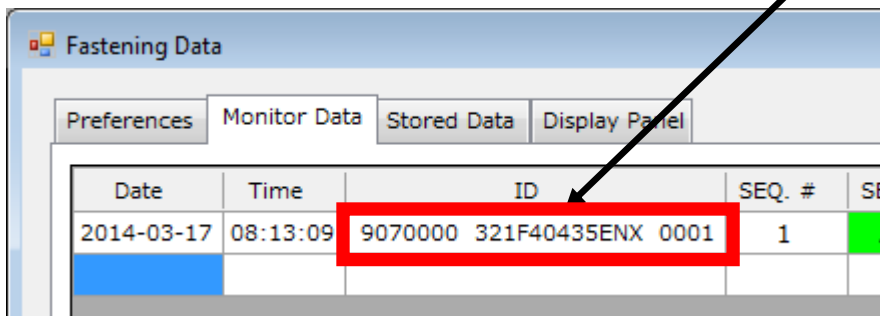


Caution

- The standard set value for the ID input data is 32 bytes (16 words). Be careful because even when a value beyond this is set, only the first 32 bytes are saved in the fastening result memory storage of the Controller.
- Do not use the following characters.
 “\”: backslash (yen mark), “/”: slash,
 “:”: colon, “*”: asterisk, “?”: question mark,
 “””: double quotation, “<” “>”: inequality signs, “|”: pipe sign



Device	+F	E	D	C	+B	A	9	8	+7	6	5	4	+3	2	1	0	
D4000	0	0	1	0	0	0	0	0	0	0	1	1	1	0	0	1	9
D4001	0	0	1	1	0	0	0	0	0	0	1	1	0	1	1	1	70
D4002	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	00
D4003	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	00
D4004	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	00
D4005	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	0	23
D4006	0	0	1	1	0	0	0	1	0	1	0	0	0	1	1	0	F1
D4007	0	0	1	1	0	1	0	0	0	0	1	1	0	0	0	0	04
D4008	0	0	1	1	0	1	0	0	0	0	1	1	0	0	1	1	34
D4009	0	0	1	1	0	1	0	1	0	1	0	0	1	0	1	1	E5
D4010	0	1	0	0	1	1	1	0	0	1	0	1	1	0	0	0	XN
D4011	0	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	
D4012	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0	00
D4013	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	1	10
D4014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
D4015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	--



Date	Time	ID	SEQ. #	SE
2014-03-17	08:13:09	9070000 321F40435ENX 0001	1	

MELSEC-Q Series Parameter Setting (Example)

Start up GX Developer → Prepare PC Series QCPU (Q mode) Project →

Parameter → Network Parameter → Set List of CC-Link

Example of PLC setting using (3) AFC3000 systems (3 CCLINK connections)

No. of boards in module Boards Blank: no setting.

Start I/D No	0000			
Operational setting	Operational settings			
Type	Master station			
Master station data link type	PLC parameter auto start			
Mode	Remote net(Ver.2 mode)			
All connect count	3			
Remote input(RX)	X100			
Remote output(RY)	Y100			
Remote register(RWr)	D1000			
Remote register(RWw)	D4000			
Ver.2 Remote input(RX)				
Ver.2 Remote output(RY)				
Ver.2 Remote register(RWr)				
Ver.2 Remote register(RWw)				
Special relay(SB)	S80			
Special register(SW)	SW0			
Retry count	3			
Automatic reconnection station count	1			
Stand by master station No.				
PLC down select	Stop			
Scan mode setting	Asynchronous			
Delay information setting	0			
Station information setting	Station information			
Remote device station initial setting	Initial settings			
Interrupt setting	Interrupt settings			

1. Select "Remote Net (Ver. 2 Mode)" at Mode Select.
2. Set the All Connect Count (3) for number of connected Remote Device stations
3. Set the refresh device Remote Input (X100) / Output (Y100) at "Remote Output (RX / RY)."
4. Set the refresh device Remote Register read (D1000) at "Remote Register (RWr)."
5. Set the refresh device Remote Register write (D4000) at "Remote Register (RWw)."
- * The allocated set values differ according to the station No. of the Controller used.
6. Set the station information at Station Information Setting (the picture below shows an example for reference).

Station information Setting example (#6 above)

CC-Link station information. Module 1

Station No.	Station type	Expanded cyclic setting	Exclusive station count	Remote station points	Reserve/invalid station select	Intelligent buffer select(word)		
						Send	Receive	Automatic
1/ 1	Ver.2Remote device station	octuple	Exclusive station 4	896 points	No setting			
2/ 5	Ver.2Remote device station	octuple	Exclusive station 4	896 points	No setting			
3/ 9	Ver.2Remote device station	octuple	Exclusive station 4	896 points	No setting			

Default Check End Cancel

CC-Link Fieldbus Expansion Unit

Enabling the CC-Link connection to the PLC

PLC Ladder logic is required to enable the CC-Link communication link. The logic must address the enable bit (Initial Data Processing Request) of which the address changes based on the size setting used. The last 16 bits of both the Inputs and outputs (no matter what size is configured) is the CCLINK system setting area and this is where the link must be enabled.

Below is an example of CC-Link configuration settings made by GX Developer software and how memory is allocated. This configuration has 3 sets of AFC3000 controllers connected with 4 occupied stations / 8 extended cyclic cycles. (I/O 896 Points, Message 72 Words)

Item	AFC3000 (System 1)	AFC3000 (System 2)	AFC3000 (System 3)
CC-Link Station Number	1	5	9
Configured Size (4 occupied stations/8Cyclic cycles)	896 (880 useable)	896 (880 useable)	896 (880 useable)
EM-STOP (First bit of PLC output)	Y100	Y480	Y800
Total Reject (First bit of AFC3000 Output)	X100	X480	X800
Part ID message output to AFC3000 Controllers	D4000	D4072	D4144
Fastening result message from AFC3000 controllers	D1000	D1072	D1144
CC-Link Request address	X478	X7F8	XB78
CC-Link Enable address	Y478	Y7F8	YB78

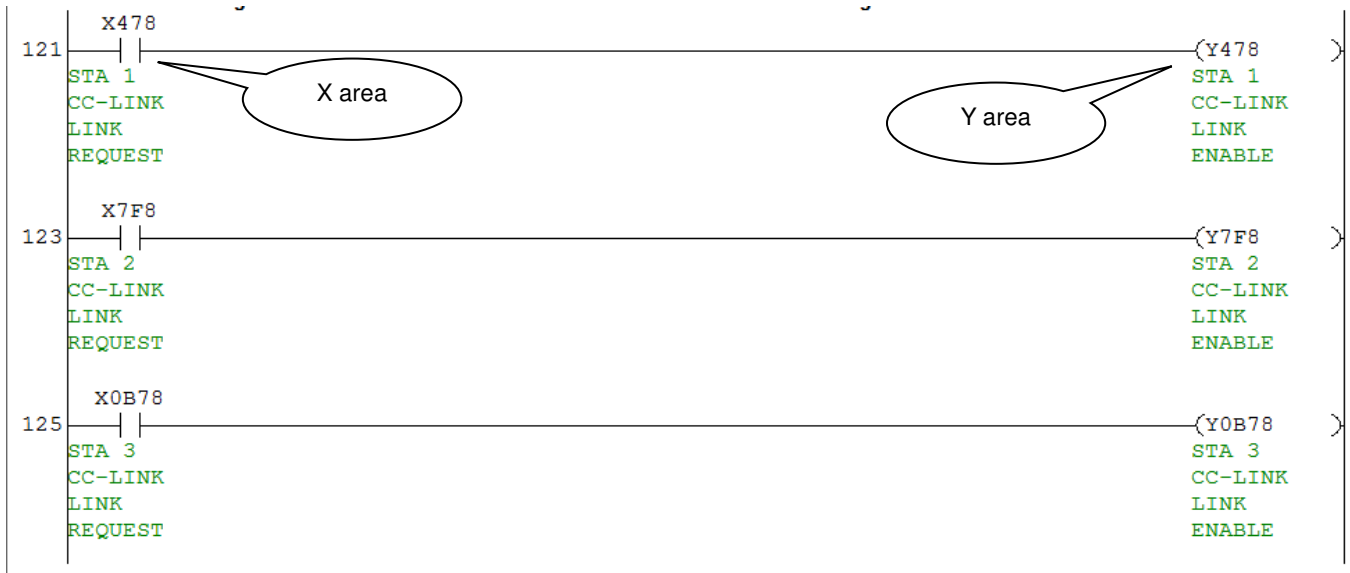
In the case of the first AFC3000 System (1) (shown in the table above), the PLC program is set so that when the 888th (378h) bit ("Initial Data Processing Request") in the (CC-Link Reserved) system area (X area) is turned "ON", the output at the 888th (378h) bit ("Initial Data Processing Complete") of the system area (Y area) is set "ON". **(Note: See pages 8 & 14 for CCLINK handshaking signal location)**

Since the X/Y starting address of (System 1) is configured to start at X100 and Y100, this must be added to the addresses and therefore (100h+378h) 478h is specified for the X area and the Y area as shown in the PLC Logic diagram below to enable Station 1's link.

For Station 2's link, the starting address (X/Y480) is added to the 888th (378h) bit for that station which is address (480h + 378h) X/Y7F8.

For Station 3's link, the starting address (X/Y800) is added to the 888th (378h) bit for that station which is address X/YB78.

PLC Logic example that would be required to enable the CC-Link in the three systems listed above



• Location of Handshaking Bits According to Size Configuration

Cyclic Cycles Setting	1 Occupied Station	2 Occupied Stations	3 Occupied Stations	4 Occupied Stations
1	24th bit 18h	56th bit 38h	88th bit 58h	120th bit 78h
2	24th bit 18h	88th bit 58h	152th bit 98h	216th bit D8h
4	56th bit 38h	184th bit B8h	312th bit 138h	440th bit 1B8h
8	120th bit 78h	376th bit 178h	632th bit 278h	888th bit 378h

(Location of "Initial Data Processing Request" and "Initial Data Processing Complete" Bits)

"h" = hexadecimal

Fieldbus Message Bank Select Function

This Function is added to Firmware Version 1.214 (and after) and AFC3000 User console software version 1.101 (and after)

The Bank Select function allows the ability to send Fieldbus message data of more than the limit of 128 words by adding the ability to 'offset' the spindle address (Axis) and sending in an additional message. This is used in cases where 128 words is not sufficient to send all data for the number of spindles you may have.

(As an example, a first message could be sent for spindles #1-15 and an additional message sent for Spdl. #16-30 by offsetting the spindle address to 16)

Input Signal Message Axis Offset Select Bit 0~4

Selects the Spindle number offset (or shift) of fieldbus message fastening result output data.

When the fastening sequence processes the "Data Report" or "End (with Data Report)" command, the system outputs the fastening result data starting with the spindle number selected by this offset selection (as below).

If the amount of fastening result data does not fit into the fieldbus message size (due to a combination of the number of spindles and data programmed to transfer), this function can be used for transferring all spindle data.

Message Axis Offset Selection					Message Start Spindle Number
BIT 4	BIT 3	BIT 2	BIT 1	BIT 0	
OFF	OFF	OFF	OFF	OFF	1
OFF	OFF	OFF	OFF	ON	2
OFF	OFF	OFF	ON	OFF	3
OFF	OFF	OFF	ON	ON	4
OFF	OFF	ON	OFF	OFF	5
OFF	OFF	ON	OFF	ON	6
OFF	OFF	ON	ON	OFF	7
OFF	OFF	ON	ON	ON	8
OFF	ON	OFF	OFF	OFF	9
OFF	ON	OFF	OFF	ON	10
OFF	ON	OFF	ON	OFF	11
OFF	ON	OFF	ON	ON	12
OFF	ON	ON	OFF	OFF	13
OFF	ON	ON	OFF	ON	14
OFF	ON	ON	ON	OFF	15
OFF	ON	ON	ON	ON	16
ON	OFF	OFF	OFF	OFF	17
ON	OFF	OFF	OFF	ON	18
ON	OFF	OFF	ON	OFF	19
ON	OFF	OFF	ON	ON	20
ON	OFF	ON	OFF	OFF	21
ON	OFF	ON	OFF	ON	22
ON	OFF	ON	ON	OFF	23
ON	OFF	ON	ON	ON	24
ON	ON	OFF	OFF	OFF	25
ON	ON	OFF	OFF	ON	26
ON	ON	OFF	ON	OFF	27
ON	ON	OFF	ON	ON	28
ON	ON	ON	OFF	OFF	29
ON	ON	ON	OFF	ON	30
ON	ON	ON	ON	OFF	31
ON	ON	ON	ON	ON	32

Message Axis Offset Input Signal is located at bit 91 ~ 95.

CC-Link Fieldbus Expansion Unit

	Input BANK1	Input BANK2	Input BANK3	Output BANK1	
1	Emergency Stop	SEQ No.17 Select	Axis 11 BYPASS	Multi	Total Reject
2	Reset	SEQ No.18 Select	Axis 12 BYPASS	Multi	Total Accept
3	Reverse	SEQ No.19 Select	Axis 13 BYPASS	Multi	Nutrunner Abnormal
4	Start	SEQ No.20 Select	Axis 14 BYPASS	Multi	Ready
5	Sequence Select Bit 0	SEQ No.21 Select	Axis 15 BYPASS	Multi	Busy
6	Sequence Select Bit 1	SEQ No.22 Select	Axis 16 BYPASS	Multi	End
7	Sequence Select Bit 2	SEQ No.23 Select	Axis 17 BYPASS	Multi	Sequence Select Bit 0
8	Sequence Select Bit 3	SEQ No.24 Select	Axis 18 BYPASS	Multi	Sequence Select Bit 1
9	Sequence Select Bit 4	SEQ No.25 Select	Axis 19 BYPASS	Multi	Sequence Select Bit 2
10	Cycle Count UP	SEQ No.26 Select	Axis 20 BYPASS	Multi	Sequence Select Bit 3
11	Cycle Count Clear	SEQ No.27 Select	Axis 21 BYPASS	Multi	Sequence Select Bit 4
12	Sequence Select Method	SEQ No.28 Select	Axis 22 BYPASS	Multi	Axis in Bypass
13	Input Wait Port 1	SEQ No.29 Select	Axis 23 BYPASS	Multi	Fastening Result Data Available
14	Input Wait Port 2	SEQ No.30 Select	Axis 24 BYPASS	Multi	Current Limit Warning
15	Input Wait Port 3	SEQ No.31 Select	Axis 25 BYPASS	Always Off	
16	Input Wait Port 4	SEQ No.32 Select	Axis 26 BYPASS	Always Off	
17	SEQ No.1 Select	Axis 1 BYPASS	Axis 27 BYPASS	Multi	Output Port 1
18	SEQ No.2 Select	Axis 2 BYPASS	Axis 28 BYPASS	Multi	Output Port 2
19	SEQ No.3 Select	Axis 3 BYPASS	Axis 29 BYPASS	Multi	Output Port 3
20	SEQ No.4 Select	Axis 4 BYPASS	Axis 30 BYPASS	Multi	Output Port 4
21	SEQ No.5 Select	Axis 5 BYPASS	Axis 31 BYPASS	Always Off	
22	SEQ No.6 Select	Axis 6 BYPASS	Axis 32 BYPASS	Always Off	
23	SEQ No.7 Select	Axis 7 BYPASS		Always Off	
24	SEQ No.8 Select	Axis 8 BYPASS		Always Off	
25	SEQ No.9 Select	Axis 9 BYPASS		Always Off	
26	SEQ No.10 Select	Axis 10 BYPASS		Always Off	
27	SEQ No.11 Select	ID Data Clear		Always Off	
28	SEQ No.12 Select	ID Select enable	Message Axis Offset Bit 0	Multi	Message Axis Offset Bit 0
29	SEQ No.13 Select		Message Axis Offset Bit 1	Multi	Message Axis Offset Bit 1
30	SEQ No.14 Select		Message Axis Offset Bit 2	Multi	Message Axis Offset Bit 2
31	SEQ No.15 Select		Message Axis Offset Bit 3	Multi	Message Axis Offset Bit 3
32	SEQ No.16 Select		Message Axis Offset Bit 4	Multi	Message Axis Offset Bit 4

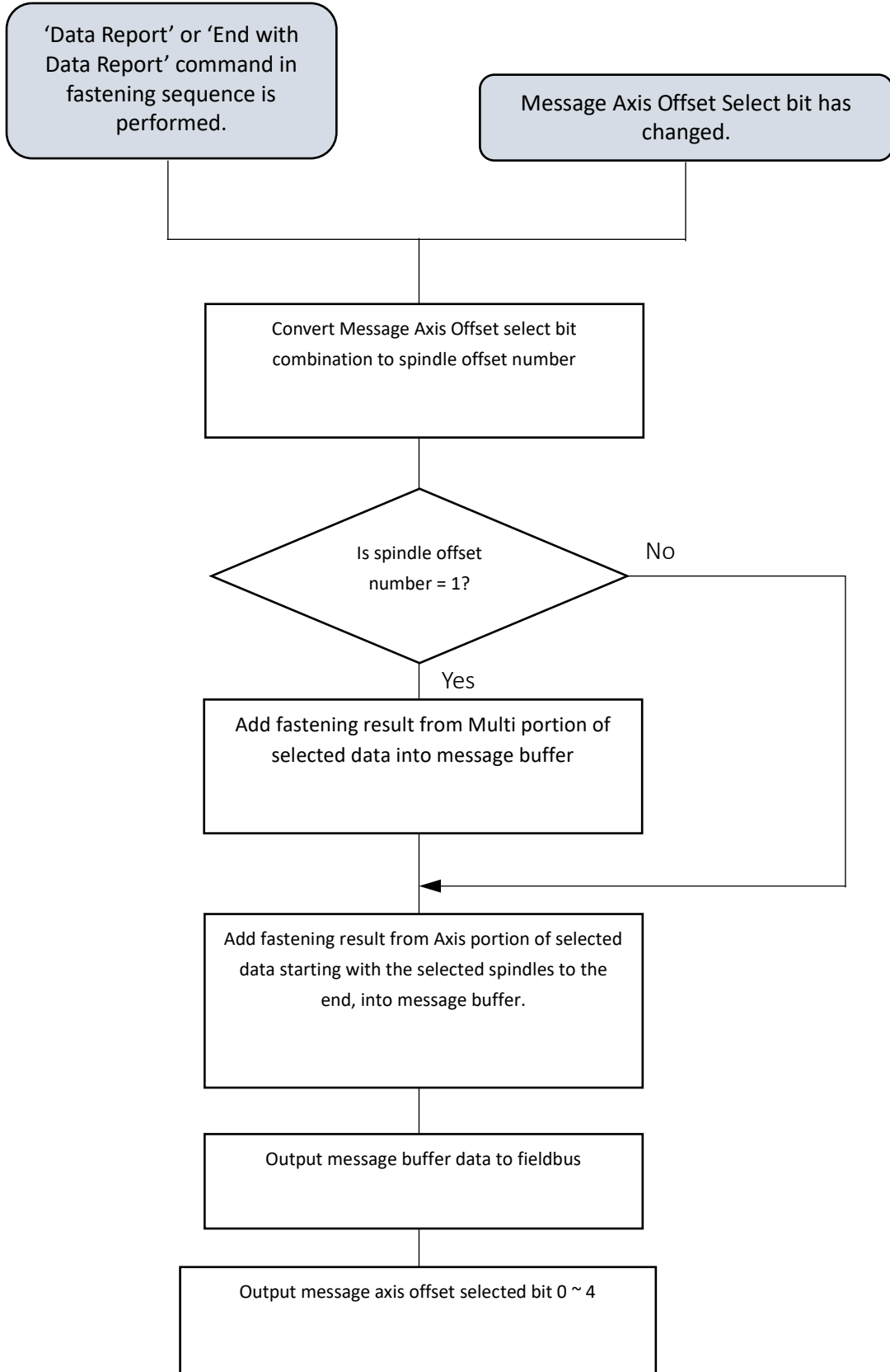
Output Signal Message Axis Offset Selected Bit 0~4

This signal outputs **AFTER** the message start spindle number is internally switched (after the inputs were turned ON) and can be used to confirm the selection in the PLC logic. The combination of signal bits are identical with input.

In the AFC3000 software, the address of the output signals can be assigned in the PLC Output Layout Setup Screen. Select 'Multi' as the unit and these signals are available at bottom of selections.

26	Always Off		
27	Always Off		
28	Multi	Message Axis Offset Select	Message Axis Offset Bit 0
29	Multi	Message Axis Offset Select	Message Axis Offset Bit 1
30	Multi	Message Axis Offset Select	Message Axis Offset Bit 2
31	Multi	Message Axis Offset Select	Message Axis Offset Bit 3
32	Multi	Message Axis Offset Select	Message Axis Offset Bit 4

- Total Reject
- Total Accept
- Nutrunner Abnormal
- Ready
- Busy
- End
- Sequence Select(Bit)
- Sequence Select(Number)
- Output Port
- Axis in Bypass
- Current Limit Warning
- Fastening Result Data Available
- CAL Warning
- Zero Voltage Warning
- Message Axis Offset Select
 - Message Axis Offset Bit 0
 - Message Axis Offset Bit 1
 - Message Axis Offset Bit 2
 - Message Axis Offset Bit 3
 - Message Axis Offset Bit 4



Setup Example

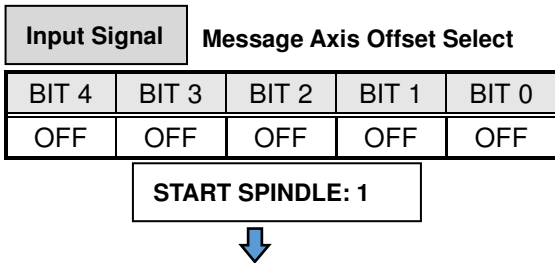
Fieldbus Setup

Fieldbus Type	CC-Link V2
Occupied Stations	3 Stations
Extended Cyclic Setting	8 Cycles
Remote Register (RWr)	87 Words [^]

Fieldbus Message Output Setup

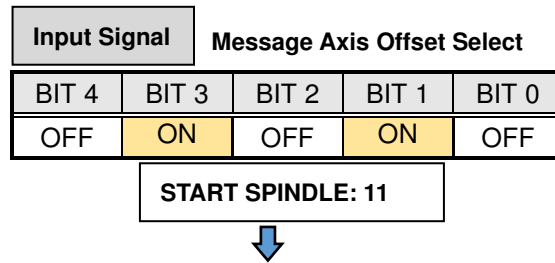
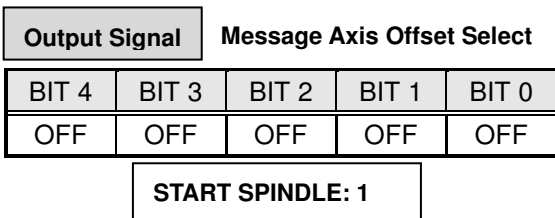
Data Format	BCD		
Multi Format	Date	2 Words	4 Words
	Time	2 Words	
Axis Format	Axis No.	1 Word	8 Words
	Parameter No.	1 Word	
	Peak Torque	2 Words	
	Final Angle	2 Words	
	Rundown Revolutions	2 Words	

WITH MULTI FORMAT DATA



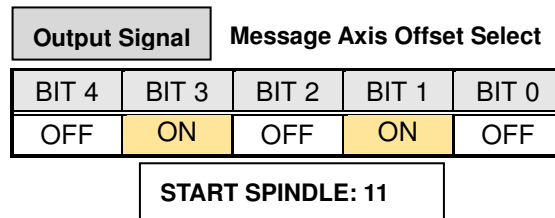
Fieldbus Message Data Output

Remote Register (RWr) 87 Words	Multi Data	4 Words
	Spindle 1 Data	8 Words
	Spindle 2 Data	8 Words
	Spindle 3 Data	8 Words
	Spindle 4 Data	8 Words
	Spindle 5 Data	8 Words
	Spindle 6 Data	8 Words
	Spindle 7 Data	8 Words
	Spindle 8 Data	8 Words
	Spindle 9 Data	8 Words
	Spindle 10 Data	8 Words

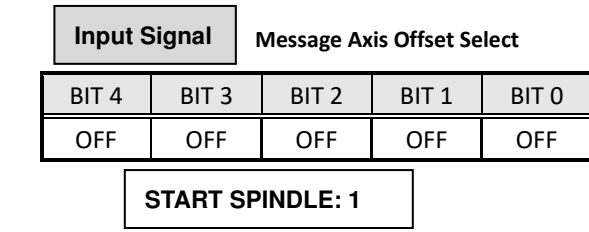


Fieldbus Message Data Output

Remote Register (RWr) 87 Words	Spindle 11 Data	8 Words
	Spindle 12 Data	8 Words
	Spindle 13 Data	8 Words
	Spindle 14 Data	8 Words
	Spindle 15 Data	8 Words
	Spindle 16 Data	8 Words
	Spindle 17 Data	8 Words
	Spindle 18 Data	8 Words
	Spindle 19 Data	8 Words
	Spindle 20 Data	8 Words

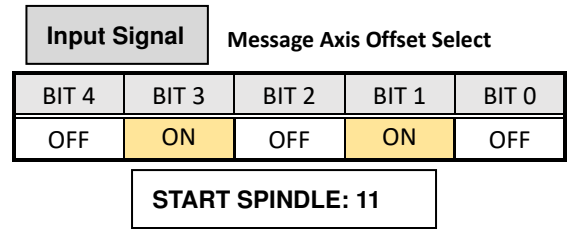
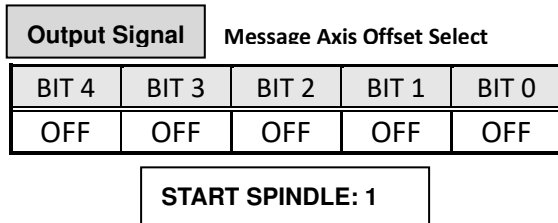


WITHOUT MULTI FORMAT DATA



Fieldbus Message Data Output

Remote Register (RWr) 87 Words	Spindle 1 Data	8 Words
	Spindle 2 Data	8 Words
	Spindle 3 Data	8 Words
	Spindle 4 Data	8 Words
	Spindle 5 Data	8 Words
	Spindle 6 Data	8 Words
	Spindle 7 Data	8 Words
	Spindle 8 Data	8 Words
	Spindle 9 Data	8 Words
	Spindle 10 Data	8 Words



Fieldbus Message Data Output

Remote Register (RWr) 87 Words	Spindle 11 Data	8 Words
	Spindle 12 Data	8 Words
	Spindle 13 Data	8 Words
	Spindle 14 Data	8 Words
	Spindle 15 Data	8 Words
	Spindle 16 Data	8 Words
	Spindle 17 Data	8 Words
	Spindle 18 Data	8 Words
	Spindle 19 Data	8 Words
	Spindle 20 Data	8 Words

