청원산기㈜ - 씨에프티유한책임회사

플라즈마 절단기 생산관리시스템

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WireLab
PC기반 제어,측정,테스트 및 자동화 솔루션

시스템 개요 및 개발범위

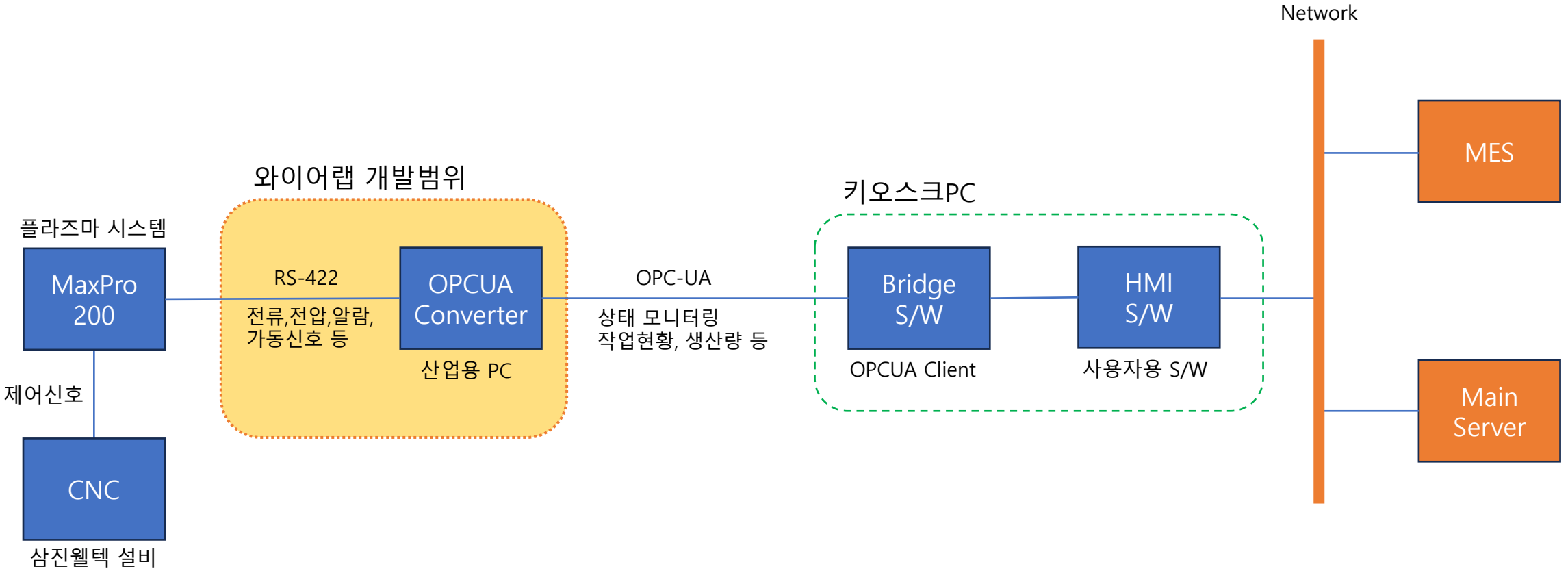
개발범위

- 개발범위

  - 설비 데이터 수집
    - RS422 통신으로 MAXPRO200에서 데이터 획득
    - 생산량, 작업시간, 전압/전류, 설비 가동현황, 에러데이터 등
    - 설정된 시간마다 데이터를 요청하여 데이터 수집

  - OPCUA 서버 개발
    - RS422로 획득한 데이터를 OPCUA 데이터로 변환하여 운용
    - 암호화, 계층화, 표준화 개발

시스템개요


Network
MES
와이어랩 개발범위
키오스크PC
플라즈마 시스템
MaxPro 200
RS-422
전류,전압,알람,
가동신호 등
OPCUA Converter
산업용 PC
OPC-UA
상태 모니터링
작업현황, 생산량 등
Bridge S/W
OPCUA Client
HMI S/W
사용자용 S/W
제어신호
CNC
삼진웰텍 설비
Main Server

데이터 리스트

- GET_STATE : 플라즈마 시스템의 현재 상태
  → 2자리 Numeric값(ID) 출력
  → 씨에프티에서 Enum으로 처리 필요

ID	MaxPro State
00	POWER UP
01	INITIAL CHECKS
02	GAS PURGE
03	READY FOR START
04	PREFLOW
05	PREFLOW HOLD
06	IGNITE
07	PILOT ARC
08	RAMPUP
09	MAIN ARC
10	RAMPDOWN
11	RAMPDOWN COMPLETE
12	END OF CYCLE
13	----------
14	SHUTDOWN
15	RESET
16	MAINTENANCE
17	STANBY

- READ_INPUTS : Board로 입력되는 값
  → 각각에 대한 Boolean값 출력

  - Plasma Start
  - Alt Start
  - Hold Ignition
  - Arc Detect
  - Power On
  - Chopper A Overcurrent
  - Chopper B Overcurrent

** HPR_and_MaxPro_CNC_Interface_Protocol 참고

데이터 리스트

- GET_PS_INFO : 압력, 시스템상태, 에러 등
  → 각각에 대한 Numeric값 출력

  - System State
  - System Error
  - Plasma Gas Type Code
  - Plasma Pressure Setpoint
  - Shield Gas Type Code
  - Shield Pressure Setpoint
  - Current Setpoint
  - Display Mode
  - Lock Mode

- GET_CONTROL_DATA : 내부 제어 데이터
  → 각각에 대한 Numeric값 출력

  - Plasma actual pressure in psi
  - Shield actual pressure in psi
  - Inlet pressure in psi
  - Coolant temp in ADC counts
  - Chopper temp in ADC counts
  - Channel A current in amps
  - Channel B current in amps
  - Transformer temp in counts
  - Inductor A temp in ADC counts
  - Inductor B temp in ADC counts
  - Bus Voltage in volts
  - Coolant flow in gpm

** HPR_and_MaxPro_CNC_Interface_Protocol 참고

데이터 리스트

- CURENT_ERROR : 현재 시스템 에러
  → 3자리 번호(ID)만 출력
  → 씨에프티에서 Enum으로 처리 필요

ID	Name	Description
000	NO ERROR	System is ready to run
009	FLOW SWITCH TEST	When the pump is restarted after a pump timeout (30 minutes without a start signal) the system will test the flow switch to make sure there is sufficient flow before firing the torch.
012	TEST IN PROGRESS	One in the gas test modes is running
013	TEST PASSED	The test completed successfully
014	CUT GAS CHANNEL #1 FAIL	The gas pressure is dropping on channel #1, indicating a leak
015	CUT GAS CHANNEL #2 FAIL	The gas pressure is dropping on channel #2, indicating a leak
016	PLASMA RAMPDOWN FAIL	Plasma pressure did not decrease in the allotted time
017	SHIELD RAMPDOWN FAIL	Shield pressure did not decrease in the allotted time
018	PUMP OVER PRESSURE	Pump output has exceeded 200 psi
020	NO PILOT ARC	No current detected from choppers before 1-second timeout
021	NO ARC TRANSFER	No transfer signal detected before 300-msec timeout
024	LOST CURRENT CH1	After transfer lost chopper current signal
025	LOST CURRENT CH2	After transfer lost chopper current signal
026	LOST TRANSFER	After transfer lost the transfer signal
027	LOST PHASE	When main contactor is engaged no phase ok input
028	LOST CURRENT CH3	After transfer lost chopper current signal
030	GAS SYSTEM ERROR	A failure had a occurred in the gas system
031	START LOST	Start signal was removed before steady state operation
032	HOLD TIMEOUT	Hold signal was applied for longer than 60 seconds
033	PRE CHARGE TIMEOUT	Gas console was not able to charge the gas lines to the correct value
034	LOST CURRENT CH4	After transfer lost chopper current signal
042	N2 PURGE LOW PRESSURE ERROR	Low N2 gas pressure while purging because of switching from a fuel gas process to an oxidizing process or vice versa
044	LOW PLASMA GAS PRESSURE	Gas pressure under lower limit (15 psi preflow, 50 psi cutflow)
045	HIGH PLASMA GAS PRESSURE	Gas pressure over upper limit (110 psi)
046	LOW LINE VOLTAGE	Line voltage is under lower limit (-15%)
047	HIGH LINE VOLTAGE	Line voltage is over upper limit (+15%)
048	CAN ERROR	An error occurred with the CAN communication system
050	START ON AT INIT	Start signal input is active during power up
053	LOW SHIELD GAS PRESSURE	Gas pressure is under lower limit (2 psi)
054	HIGH SHIELD GAS PRESSURE	Gas pressure is over upper limit (110 psi)
055	MV 1 INLET PRESSURE	Motor valve 1 inlet pressure is less than 90 psi or greater than 130 psi.
056	MV 2 INLET PRESSURE	Motor valve 2 inlet pressure is less than 90 psi or greater than 130 psi.
057	CUT GAS 1 PRESSURE	In the selection console, cut gas 1 outlet pressure is less than 90 psi or greater than 130 psi.

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데이터 리스트

- CURENT_ERROR : 현재 시스템 에러

058	CUT GAS 2 PRESSURE	In the selection console, if cut gas 2 outlet pressure is less than 90 psi for non mixing or less than 20 psi when mixing or greater than 130 psi.
060	LOW COOLANT FLOW	Coolant flow is present but is less than the required 0.6 gpm
061	NO PLASMA GAS TYPE	Plasma gas has not been selected
062	NO SHIELD GAS TYPE	Shield gas has not been selected or system is in test mode
065	CHOPPER1 OVERTEMP	Chopper #1 overheated
066	CHOPPER2 OVERTEMP	Chopper #2 overheated
067	MAGNETICS OVERTEMP	Transformer has overheated
071	COOLANT OVERTEMP	Torch coolant has overheated
072	AUTOMATIC GAS CONTROL BOARD OVERTEMP	Control board has exceeded 90 degrees C
073	CHOPPER3 OVERTEMP	Chopper #3 overheated
074	CHOPPER4 OVERTEMP	Chopper #4 overheated
075	LEM 3 CURRENT LOW	Current is less than 10 amps during the chopper test
076	LEM 4 CURRENT LOW	Current is less than 10 amps during the chopper test
093	NO COOLANT FLOW	Coolant flow is less than 0.6 gpm or greater than 3.0 gpm
095	LEM 4 CURRENT HIGH	Current has exceeded 35 amps during chopper test
099	CHOPPER1 OVERTEMP AT INIT	Chopper #1 is indicating overtemp during powerup
100	CHOPPER2 OVERTEMP AT INIT	Chopper #2 is indicating overtemp during power up
101	MAGNETICS OVERTEMP AT INIT	Transformer is indicating overtemp during powerup
102	LEM SENSOR A FAULT	Chopper A current signal is invalid
103	LEM 1 CURRENT HIGH	Current has exceeded 35 amps during chopper test
104	LEM 2 CURRENT HIGH	Current has exceeded 35 amps during chopper test
105	LEM 1 CURRENT LOW	Current is less than 10 amps during the chopper test
106	LEM 2 CURRENT LOW	Current is less than 10 amps during the chopper test
107	LEM 3 CURRENT HIGH	Current has exceeded 35 amps during chopper test
108	TRANSFER AT INIT	The system has detected current on the work lead during power up
109	COOLANT FLOW AT INIT	Coolant flow is greater than 0.3 gpm when pump is off.
111	COOLANT OVERTEMP AT INIT	Coolant is indicating overtemp during powerup
116	WATCHDOG INTERLOCK	CAN communication error
123	MV 1 ERROR	Motor valve 1 did not move into position within 60 seconds
124	MV 2 ERROR	Motor valve 2 did not move into position within 60 seconds
133	UNKNOWN GAS CONSOLE TYPE	The power supply control board does not recognize the gas console installed or has not received a CAN message identifying the type of console installed
134	CHOPPER 1 OVERCURRENT	Chopper 1 current feedback has exceeded 160 amps
138	CHOPPER 2 OVERCURRENT	Chopper 2 current feedback has exceeded 160 amps

139	PURGE TIMEOUT ERROR	The purge cycle did not complete within 3 minutes
140	PRESSURE TRANSDUCER #1 ERROR	Selection Console – Motor Valve #1 inlet Metering Console – Plasma gas outlet
141	PRESSURE TRANSDUCER #2 ERROR	Selection Console – Motor Valve #2 inlet Metering Console – Shield gas outlet
142	PRESSURE TRANSDUCER #3 ERROR	Selection Console – Cut Gas 1 outlet Metering Console – Cut Gas 1 inlet
143	PRESSURE TRANSDUCER #4 ERROR	Selection Console – Cut Gas 2 outlet Metering Console – Cut Gas 2 inlet
144	MANUAL GAS CONSOLE INTERAL FLASH ERROR	DSP memory is not working properly
145	AUTO GAS CONSOLE INTERNAL FLASH ERROR	DSP memory is not working properly
146	CHOPPER #3 OVERTEMP AT INIT	Chopper #3 is indicating over temp during power up
147	CHOPPER #4 OVERTEMP AT INIT	Chopper #4 is indicating over temp during power up
151	SOFTWARE FAIL	Software has detected an incorrect state or condition
152	INTERNAL FLASH ERROR	DSP memory is not working properly
153	PS EEPROM ERROR	EEPROM memory on power supply board not working
154	CHOPPER 3 OVER CURRENT	Chopper 3 current feedback has exceeded 160 amps
155	CHOPPER 4 OVER CURRENT	Chopper 4 current feedback has exceeded 160 amps
156	CHOPPER 2 CURRENT AT INIT	Chopper 2 current signal is active on powerup
157	CHOPPER 3 CURRENT AT INIT	Chopper 3 current signal is active on powerup
158	CHOPPER 4 CURRENT AT INIT	Chopper 4 current signal is active on powerup
159	MOTOR DRIVE FAULT	Motor drive board power module is indicating an alarm – This can be comparable to “blowing a fuse” – does not necessarily indicate a problem with the board.
160	HPR COOLER CAN FAULT	Communications between the control board and the pump/motor drive board was interrupted for greater than 1 second.
180	SELECTION CONSOLE CAN TIMEOUT	Power supply has not received a CAN message from the selection console within 1 second
181	METERING CONSOLE CAN TIMEOUT	Power supply has not received a CAN message from the metering console within 1 second
190	LEM SENSOR B FAULT	Chopper B current signal is invalid

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