
1.

Plant	Plant
(Basic Engineering) (Piping & Instrument Diagram), Data Sheet (Requisition For Quotation), TBE(Technical Bid Evaluation), Vendor Print Review, Loop Drawing, Hook Up Drawing, Instrument Location Plan Drawing, Control Room Layout DWG , Cable & Conduit Layout DWG, Wiring Inter-Connection DWG, Typical Detail DWG, Instrument Construction Specification	PFD(Process Flow Diagram), P&ID Instrument Index, RFQ

2.

1)

가
, , , , ,
가 , ,
가

2)

- (1) . ()
- (2) Process
- (3)

3)

- (1) ,
- (2) ,

-
- (3) Cost
 - (4)
 - (5)

4)

- (1) Job Flow , .
- (2)
- (3)
- (4)
- (5)

가. Process

- .
- .
- .
- .
- .
- .
- .

5)

가 .

- (1) 가.
 - .
 - Interlock Logic Diagram
Maker
 - .
 - .
 - .

- (2) 가. Plot Plan
 - . Piping Arrangement Drawing
 - . Piping Isometric Drawing
 - . Piping Material Specification.

-
- (3)
가. P & ID, UFD , PFD
. Process Data
. Shut Down System

- (4)
가.
. ENGINEERING DRAWING
. EQUIPMENT LIST
. PACKAGE ITEMS

- (5) ,
가. PIPE RACK & STRUCTURE DRAWING
.

- (6)
가. MAIN CABLE PLAN
. HAZARDOUS AREA PLAN

6)

- (1) (INSTRUMENT PIPING HOOK-UP)
(2) (INSTRUMENT STEAM TRACING HOOK-UP)
(3) (INSTRUMENT ANALYZER PIPING HOOK-UP)
(4) (CONTROL ROOM ARRANGEMENT PLAN)
(5) (CONTROL ROOM WIRING PLAN)
(6) DUCT/TRAY (INSTRUMENT DUCT/TRAY PLAN)
(7) (INSTRUMENT MAIN CABLE PLAN)
(8) (INSTRUMENT LOCATION PLAN)
(9) (INSTRUMENT WIRING PLAN)
(10) (INSTRUMENT AIR PIPING PLAN)
(11) (INSTRUMENT SCHEMATIC LOOP DIAGRAM)
(12) , (INSTRUMENT CONNECTION LIST)
(13) (INSTRUMENT TYPICAL DETAIL DRAWING)
(14) INSTRUMENT KEY PLAN
(15) SYMBOL & LEGEND

3.

(SCOPE OF WORK)

가

1) ,

(1) MANHOLE, PIT, CABLE DUCT, CABLE TRAY, CABLE TRENCH ,
DUCT

BANK

(2) ,

(3) CONTROL ROOM LAYOUT, PANEL , CABLE ROUTE

2)

(1) NOZZLE POINT & SIZE

(2) , SUPPORT STAGE

(3) PACKAGE ITEMS WORK SCOPE

3)

(1) CABLE DUCT/TRAY ROUTE ,

(2) IMPULSE LINE SCOPE

(3) AIR PIPING & UTILITY SCOPE

(4) SCOPE

(5) , UTILITY

(6) IN-LINE INST.

* " RESPONSIBILITY SCOPE OF WORK

BETWEEN

INSTRUMENT & PIPING"

JOB PIPING

WORK SCOPE

4)

(1) CABLE ROUTE

(2) INTERLOCK SEQUENCE, RUNNING LAMP SCOPE

(3) SCOPE

(4) SCOPE

(5) CONSENT

5) /

- (1) , ITEM
- (2) ITEMS
- (3)

4.

1) PANEL ARRANGEMENT IN THE CONTROL ROOM

- (1)
- (2) (DOOR OPENING)
- (3) FUTURE
- (4) , , CCTV, 가 , PACKAGE

- (5) CABLE, DUCT/TRAY, TRENCH ROUTE
- (6) PANEL
 - FLOOR
 -
 - PANEL ()
 - CHANNEL BASE
- (7) PANEL
- (8) (, , , ,)
- (9)
- (10)
- (11) CABLE

2) LOCATION PLAN

- (1) MONITORING (OPERATION)
- (2)
- (3) ACCESS 가
- (4) 가 P&ID CHECK
- (5) TAPPING TRANSMITTER (PIPING HOOK-UP
DWG.)
- (6)
 - ,
 - SAMPLING LINE ,
 - (,)

3) DUCT/TRAY PLAN



-
- (1) ROUTE
 - (2) ()
 - (3) EQUIPMENT
 - (4) LEVEL
 - (5) CABLE
 - (6) SUPPORT POINT 가
 - (7) CABLE
 - (8) CABLE , SIZE
 - (9) SYSTEM CABLE DATA HIGH.WAY
 - (10) SEPARATION
 - (11) PART COORDINATION SCOPE OF WORK
 - (12) FUTURE

4) WIRING PLAN



- (1) 가
- (2) ,
- (3) LEVEL
- (4)
- (5) CLASS
- (6) ROUTE
- (7) CABLE
- (8) DIGITAL SYSTEM CABLE DATA HIGH.WAY
CABLE
- (9)
- (10) PART SCOPE OF WORK

5) AIR PIPING & SIGNAL TUBING PLAN

- (1) INST- AIR 가
- (2) INST- AIR ,
- (3) INST- AIR PART SCOPE
- (4) PLANT AIR
- (5) AIR TANK MAIN HEADER SIZE
- (6) BLOCK VALVE SIZE
- (7) 1 PILOT 가 AIR
- (8) PILOT SIZE
- (9) ROUTE
- (10) PART SCOPE OF WORK
- (11) SPARE & FUTURE

(12)

-
- J.B
- ,
- SUPPORT
- SPARE

6) PROCESS

(1) PROCESS

- 가 가,
-

(2)

- TYPE

(3)

- , TAP

(4) TRACING

- ()
- TRACING INSULATION TYPE
-
-

(5)

IMPULSE LINE

(6) TAP

(7)

- (, ,)
- ()
-
-
-

(8) SEAL POT

CONDENSATE POT

(9)

TUBING TYPE PIPING TYPE

- , , , COST
- (,)

(10)

PART SCOPE OF WORK

(11)

SERVICE

- , SERVICE (/)
- , SERVICE (HEAD /)
-) SERVICE (SEAL /)

PURGE)
- SERVICE

5.

1) Instrument Index(Instrument Schedule)

P&ID Construction DWG Condition	Instrument Instrument Specification	Index Instrument Specification	Operating Operating Condition
(1) P & ID Data Sheet Tag No.	Instrument Specification	List / Operating Condition	
(2) Date	Vendor Print		Up-
(3) Reference DWG No.	Loop DWG, RFQ No.		
(Sorting	가)	Data Base	
(4) Final Vendor Print Function Test 가	Instrument Specification As Built		
(5) Document	SK STD DWG ESD-70240		

2) RFQ (Requisition For Quotation)

(Specification), ,
,Recommended Vendor List, Commercial

(1) Process Data Sheet Sample	Instrument Data Sheet Instrument Type, Input Range, Output Signal, Area
----------------------------------	--

Clarification, Process Connection Type, Accessary .

(2) Sample (SK ENGINEERING STD)

가. ❶ Process Orifice Type (Concentric, Eccentric, etc.)

. ❷ Specify Manufacturer Standard .

. ❸ Orifice Bore .

. ❹ Plate .

. ❺ Ring Material Type .

. ❻ Manufacturer Model No. .

. ❼ Orifice Tape Type .

. ❽ Tape Size

. ❾ Orifice Flange Type ()

. ❿ Line Class Orifice Flange Material

. Meter Meter Type, D/P Range, Scale Range Process Data Sheet .

. Plate & Flange BETA=d/D Ratio Vent/Drain
Hole , Plate Thickness .
(SK ESS)

PROJECT SPECIFICATION FLOW INSTRUMENTS	NO. _____ REV. _____ SHEET _____ OF _____ DATE _____		
	PREPARED	CHECKED	APPROVED

ORIFICE PLATES			ORIFICE FLANGES		
❶. CONCENTRIC OTHER ❷. MFR STANDAR OTHER ❸. BORE: MAXIMUM RATE NEAREST 1/8" ❹. MATERIAL: 304SS 316SS OTHER ❺. RING MATERIAL & TYPE ❻. MFR. MODEL NUMBER			❶. TAPS: FLANGE VENA CONTRACT PIPE OTHER ❷. TAP SIZE: 1/2" NPT OTHER ❸. TYPE: WELD NECK SLIP ON THREADED ❹. MATERIAL: STEEL OTHER ❺. FLANGES INCLUDED BY OTHER		
FLUID DATA			METER		
12	TAG NUMBER		31	TYPE OF METER	
13	SERVICE		32	DIFF. PRESS RANGE	
14	LINE NO.		33	SCALE RANGE	
15	FLUID STATE		34		
16	MAX. FLOW (kg/hr)		35		
17	NOR. FLOW (kg/hr)		36		
18	PRESSURE (kg/cm ² .g)		37		
19	TEMPERATURE		PLATE & FLANGE		
20	Sp.Gr @BASE		41	BETA=d/D	
21	Sp.Gr @OPER. TEMP		42	ORIFICE BORE DIAMETER	
22	MOL. WEIGHT		43	LINE. I.D	
23	VISCOSITY @OPER. cp		44	FLANGE RATING	
24			45	VENT OR DRAIN HOLE	
25			46	PLATE THICKNESS	

NOTE

1. VENDOR SHALL STAMP UPSTREAM SIDE OF ORIFICE PLATE WITH TAG.NO, MATERIAL, LINE SIZE, FLANGE RATING & BORE AS A MINIMUM.
2. THE ORIFICE BORE DIAMETER IS ADJUSTED FOR THE VENT / DRAIN (VENT / DRAIN HOLE DIAMETER ARE PER ISA STANDARD ISA-RP3.2)
BETA IS EXPRESSED AS THE RATIO OF THE ADJUSTED ORIFICE BORE DIAMETER OVER THE LINE I.D

3) TBE(Technical Bid Evaluation)

- Bidder 가 Requirement 가
 , , 가
- (1) Bidder () TBE
- (2) RFQ Instrument Data Sheet Vendor /
 Table .
- (3) Bidder
 Clarification Letter
 가 TBE .
- (4) Cost, , Maintenance , Spare Parts
 Project Bidder , .

4) Vendor Print Review

- TBE Vendor Approval DWG
 Construction DWG , Final
 Vendor Print .
- (1) APPROVAL DWG POWER CONSUMTION, AIR , HOOK-UP
 DWG .
- (2) FINAL VENDOR PRINT
 COMMENTS .

6.

1) (CONTROL ROOM EQUIPMENT LAYOUT)

CONTROL ROOM PANELS
PLANT , , , FUTURE PANEL
CABLE .

(1) CABINET RACK ROOM DCS CABINET, PACKAGE
PANEL
CONVENTIONAL PANEL ,
PANEL CABLE

(2) , , CCTV, 가 , PACKAGE

(3)

(4)PANEL ,

2) (CONTROL ROOM WIRING)

(1) CABLE DUCT, TRAY TRENCH .

(2)TRENCH Cable Inform .

(3)DUCT/TRAY 가 ,
DUCT/TRAY CABLE
CONTROL ROOM
SEALING . SEALING

(4) ACCESS FLOOR CABLE
DUCT/TRAY , .

가. CABLE
· SIGNAL, POWER, SYSTEM CABLE

가 DUCT TRAY CABLE
· TRAY , SIGNAL, POWER CABLE
, TRAY SEPARATOR
TRAY 3m 30x30x5t ANGLE TRAY
ACCESS FLOOR DESIGN

(5) CABLE

(6) CABLE DUCT/TRAY가 PROCESS AREA CONTROL ROOM
CABLE MANHOLE

3) (INSTRUMENT PIPING HOOK.UP)

EQUIPMENT(VESSEL, TANK,HEATER), DUCT ,
PROCESS

ROCESS LEADING

가 가

가

(1) PROCESS

滯留 가 , 滯留

가

가

가

(2)

가.

가
가
“ , MANUAL” , , ,
.

가 가 . 가 가
1

가 가
ZERO 가 .

(3)

가.

- (a) PIPING TUBING TYPE 2가
- (b) PIPING TUBING

. TUBING

- (a) PIPE 가
- (b)
- (c)
- (d)
- (e) 가

(f) TYPE 가 .
 (g) 가 가 .
 (h) TUBE
 CARBON STEEL
 가 .
 (i) LEAK가
 ERROR .
 TUBE VIBRATION
 LEAK가 .
 VIBRATION PROCESS
 CONDITION 600# RATING
) 2) 2.8 - (6)
 PROJECT
 (CLIENT) .

(4) SIZE
 가 , , ,
 ,
 PROJECT 1/4" 1/2" , 1/2"

(5)
 , ,
 EQUIPMENT MAT L CODE TAP POINT
 MATERIAL SPEC. PIPING
 PIPING MAT L SPEC.
 가.
 가
 (/)
 가 .
 1M
 가 ,
 100°C 가

SEAL POT POINT SEAL POT SEAL 가
, SEAL

(6)

가 가가 가
, ,
가 , .
가.

(a) : 가
(b) :
(c) : CONDENSE POT
CONDENSE POT SEAL

PROCESS ()
ORIFICE TAP
SK Engineering Standard

(a) TAP

i) : (45°TAP) PROCESS LINE RETURN
, 45°

ii) : ,
PROCESS LINE RETURN
가

iii) 가 45° TAP

(b)

i) CONDENSATE가
가

ii) 가

LEG DRY LEG WET LEG SEAL POT WET LEG
WET LEG 가

(a) TOWER NOZZEL

NOZZEL

NOZZEL 가 가 0

(b) 가 가

가

(c)

L , U

(d) SEAL POT SEAL OVER PROCESS
, SEAL 가
SEAL

가 (:
.)

(a) PROCESS () TAP
SK Engineering Standard

(b)

(b) 가 SEAL POT

(c) SYPHON TUBE

(e) PUMP DISCHARGE
PULSATION DAMPNER LIQUID FILLED
TYPE (GAUGE)

SEAL POT CONDENSE POT

(a) CONDENSE POT 가 (Steam)

* 200 STEAM LINE

(b) SEAL POT

i) HIGH VISCOSITY FLUID

ii)

iii) WET LEG

LEVEL

iv)

가

HOOK.UP TYPE

i) GRADE MOUNTED (STANCHION TYPE)

ii) LINE MOUNTED

a)

(EQUALIZING LINE) 가 ⁽⁵⁾ .
가
0
가 가 가

b)

가 .

c)

LNG (2m) 가
LPG .30 .180 .120 ,

d)

2m 1
가
가 가
가 가

e)

f)

Dry Leg가

가

가

g)

가 가
SEAL

PURGE
PURGE

SEAL POT

SEAL , PURGE

가
가

h)

가

가

TAP
1/2B

3/4B

1B

가 PURGE

가

PURGE

가

TRACE

가

, DRY LEG

TRACE

2가

TRACE

- (a) STEAM TRACING
- (b) ELECTRIC TRACING

) 가 STEAM TRACING
 , PROJECT
 ELECTRIC TRACING . 가

* STEAM TRACING

- (a) 가 CONDENSATE POT TRACING
 CONDENSATE POT
- (b) TRACE 가 .30
 8mm, .30
- (c) TRACE STEAM TRAP
 .(SCOPE)
- (d) TRACE CONDENSE
 HEADER PROCESS
 1/100
- (e) 3~7 kg/cm²G TRACE HEADER

	()
1/2"	2
3/4"	5
1"	10
1.1/2"	20

* (INSULATION)

(300), (330),
 가

- (a)

(b)

가

(c)

0 FELT, GLASS FIBER FELT,
FELT, FOAM
POLYSTYRENE, FOAM GLASS, FOAM
VINYLE, FOAM POLYURETHANE

(d)

, Plastic Tape,
CEMENT MORTAR,
PLASTER, PLASTER, HARD CEMENT

(e)

4) INSTRUMENT KEY PLAN

PLANT AREA
AREA DWG. NO.
AREA PLAN INDEX가
KEY PLAN

(1) OVERALL PLOT PLAN CABLE AIR LINE
P&ID

SCALE

가.
) STANDARD SCALE
M/H
(MATCH POINT가
SIZE SCALE
A0 A1 SIZE

가 .)

5) INSTRUMENT LOCATION PLAN

(1) INSTRUMENT LOCATION

- (a) INSTRUMENT LOOP DIAGRAM
- (b) INSTRUMENT PIPING HOOK.UP
- (c) P&ID
- (d) PIPING G/A DWG.
- (e) ENGINEERING DWG.

- (2) (: LG,PG)
- (3) PANEL 가 가
- (4) 2" STANCHION PIPE
1500mm
- (5) 가 HOLD MARK

6) INSTRUMENT (DUCT/TRAY) PLAN & MAIN CABLE PLAN

- 가 , , STRUCTURE EQUIPMENT
CABLE PULLING ,
- (1) 가 .
- 가. PLOT PLAN
PIPE RACK 가 가
, PIPE
- RACK, STEEL STRUCTURE
- 가, 가, DUCT 가, TRAY
가, TRENCH 가
- . ROAD CROSSING, MANHOLE , SEALING

SIZE (DUCT, TRAY, TRENCH, DUCT BANK)
(CABLE) , PIPERACK DUCT

DUCT/TRAY TRAY ELEVATION
() , PIPE RACK
가 CABLE SPECIAL FITTING
CABLE PULLING CONDUIT CABLE

(2) CABLE DUCT

가. PIPE RACK DUCT/TRAY SUPPORT 3M
RACK 3M RACK L/E 3M
SUPPORT가 PIPE RACK

DUCT CABLE DUCT 20%
% CABLE FUTURE
DUCT SIZE 殘材가 DUCT
SIZE

DUCT HIGHT DUCT , PIPERACK SPACE
가

SUPPORT DESIGN HAND BOOK
SIZE

DUCT SEPARATOR LEVEL

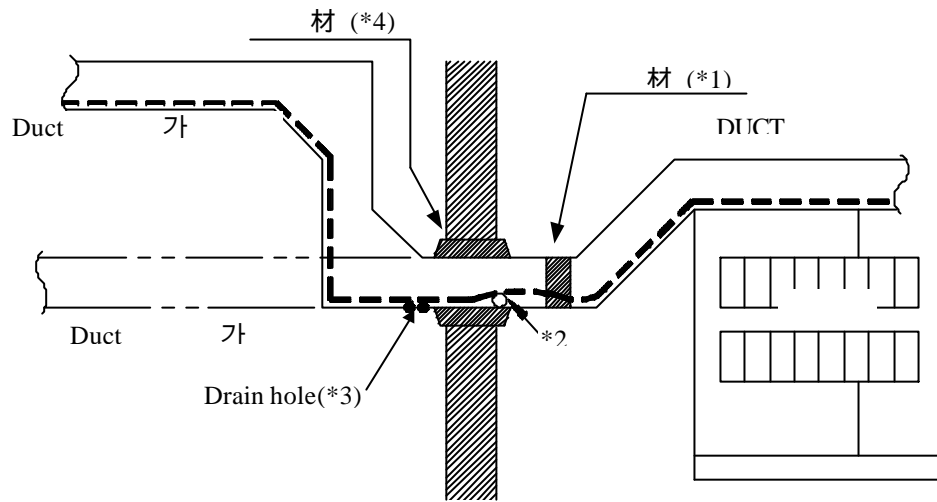
DUCT 2.3 mm 3.2 mm
600mm SIZE 3.2mm 2.3mm
, DUCT COVER 2.3 mm 1.6 mm
DUCT BODY 가 3.2mm COVER
2.3mm , 가 2.3mm 1.6mm

(3) DUCT SEALING

SEALING

GAS가 CONTROL ROOM

가. (A) DUCT SEALING SEALING
가 SEALING



*1. Duct

가

材

*2.

Duct

*3.

(DRAIN HOLE)

*4. Duct

材

(A) DUCT SEAL

(4) TRENCH

가. TRENCH SIZE

TRENCH SIZE

ROUTE

INFORM

INFORM

CABLE TRENCH

20% 가

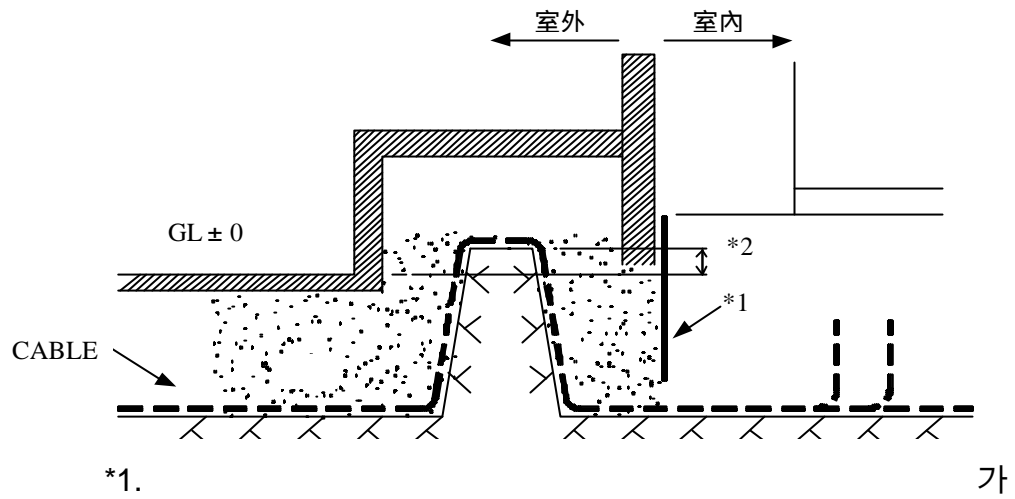
TRENCH

가 가

.TRENCH
CABLE

CABLE PULLING

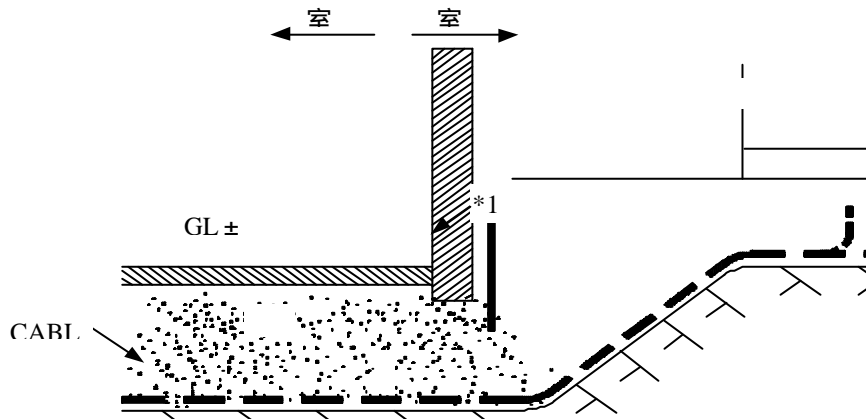
.TRENCH SEALING



*2. GL

(a)

GL



*1. 가

가

(b)

GL

(5) TROUGH

DUCT, TRENCH, DUCT BANK

CABLE TROUGH 가 , TROUGH가
 1.2M , 60CM .

(6) DUCT BANK

TRENCH 가 ROAD CROSSING
 DUCT BANK DUCT BANK
 INSTRUMENT DESIGN HANDBOOK .

(7) CULVERT

TRENCH 가 ROAD CROSSING
 CABLE PULLING
 가 .

7) INSTRUMENT WIRING PLAN

’ ’
 LEVEL LOOP -

(1)

가.

110VAC, 220VAC 100VDC, 24VDC

100 ~110V

200V

CONDUIT AC DC

(a) CABLE 600V

(mm²) MIN- 2.0mm²

SIZE

CABLE SIZE
 “ INSTRUMENT DESIGN HAND BOOK”

(b) TRENCH, TRAY SEPARATOR DUCT,

LOCAL CONTROL ROOM DCS
 ANALOG , PULSE

(a) LOW LEVEL SIGNAL : 4~20mA DC, PULSE SIGNAL, RTD,
 ANALYZER, GAS DETECTOR, FIRE ALARM ON.OFF SIGNAL(DC
 24V), SOLENOID VALVE(DC 24V), INST-POWER(DC 24V)
 THERMOCOUPLE SIGNAL, DATA COMMUNICATION SIGNAL

(b) HIGH LEVEL SIGNAL: ON.OFF SIGNAL(AC 110V, DC110V),
 PAGING(PLANT COMMUNICATION) SOLENOID VALVE(AC110V,
 DC110V), INST- POWER(AC110V/220V, AC110V)

(c) INTRINSIC SAFETY SIGNAL

CABLE DUCT/TRAY, TRENCH

(a) CABLE SIZE INST. HAND
 BOOK TABLE

(b) SIZE MAX- 1 1/2”(42mm)
 2”

(c) J.B HUB 1 1/2”(42mm) .CONDUIT SIZE
 J.B 1 1/2”(42mm)

JUNCTION BOX

(a) JUNCTION BOX LEVEL

(b) JUNCTION BOX POLE MIN- 20P MAX. 120P
 SIZE 가

1 .

NOISE

(NOISE) SHIELD GROUND (CASE)
SYSTEM GROUND SIGNAL LINE
가 .

SYSTEM MFR .
가

INFORM ENGER

(가)

4 1 , 2 , 3 3
PLC - SIGNAL LINE SYSTEM (ex: DCS,
) 3 (100Ω)

J.B, LOCAL PANEL
ENGER INFORM GROUNDING

(a) 1 : - (: 10 Ω)

(b) 2 :

(c) 3 : 300V
(: 100 Ω)

(d) 3 : 300V
(: 0 Ω)

()

(a)

(b)

(c) CABLE DUCT / TRAY

()

- (a) : 14mm²
- (b) : 2.0mm²
- (c) : 2.0mm²
- (d) DUCT/TRAY : 5.5mm²
- (e) : 14mm²

8) INSTRUMENT AIR PIPING ()

DRY UNIT
HEADER)

AIR COMPRESSOR
6~7kg/cm²G

(MAIN
HEADER)

가

가

N2 GAS GAS

(1) RESERVIOR , (

PILOT) INSTRUMENT DESIGN HAND BOOK

(2) TAKE-OFF VALVE (VALVE)
TAKE-OFF VALVE , SIZE INFORMATION

(3) 1/2" 가 30M

(4) TAKE-OFF VALVE 1 1/2" SPARE VALVE FUTURE

(5) CONTINUES CONTROL VALVE ON.OFF VALVE
TAKE-UP VALVE

(6) CONTROL VALVE 1.4 kg/cm²
가 VALVE ON-OFF VALVE, CYLINDER VALVE

(7)

0.2 ~ 1.0 kg/cm²

(a) 6mm, 8mm 2

	30m	50m	100m	200m	300m
6/4mm	0.9	1.5	2.5	5	9
8/6mm	0.7	1	2	3.5	6

(b) 6/4mm
가 70m

(c) HUNTING 가 2) 가
TANK , 가 10m