



# RMS-EX1 Rack

VAL0123042 / SKC9068177



## REFINER MONITOR SYSTEM – EX EXPANDABLE RACK RACK MANUAL



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### 1. GENERAL

The RMS-EX1 is an empty rack unit designed to hold the RMS cards for a RMS-RX1 Refiner Monitor System.

The rack is ordered together with a chosen set card for each installation. The rack can also be purchased as a spare part.

### 2. TECHNICAL SPECIFICATION

|                        |                                                                                                                       |
|------------------------|-----------------------------------------------------------------------------------------------------------------------|
| System voltage:        | +24 VDC, $\pm 10\%$ , max 2.0 A                                                                                       |
| Operating temperature: | 0 - 55 °C                                                                                                             |
| Storage temperature:   | -40 to +70 °C                                                                                                         |
| Air humidity:          | F according to DIN 40 040 (15% to 95% not condensing)                                                                 |
| Protection:            | IP00 (no protection against dust or water)                                                                            |
| Mounting:              | Mounting with 4 pcs M6 screws on a vertical mounting plate in a protecting cabinet                                    |
| Connecting cables:     | Detachable screw connectors, max 2.5mm <sup>2</sup> cable area<br>Cable shields is connected direct to the ground bar |
| Grounding:             | The rack is grounded through the ground cable                                                                         |
| CE-approval:           | According to EN 50081-2:1993, EN 50082-2:1995, 89/336/EEC<br>Test report: Enator TR976011                             |

### 3 UNITS IN THE RACK

| <i>Function</i>           | <i>D/A- article no.</i> | <i>VAL / SKC- article no.</i> |
|---------------------------|-------------------------|-------------------------------|
| Rack                      | RMS-EX1                 | VAL0123042 / SKC 9068177      |
| Control Motor Driver      | CMD-RM2                 | VAL0173903 / SKC 9101601      |
| Control Motor Interface   | CMI-RM1                 | VAL0122828 / SKC 9068191      |
| Vibration Monitor         | VIM-RM1                 | VAL0123136 / SKC 9068201      |
| Motor Power Monitor       | MPM-RM1                 | VAL0122978 / SKC 9068218      |
| Touch Point Vib. Detector | TVD-RM3                 | VAL0123117 / SKC 9251496      |
| Limit Display Unit        | LDU-RM1                 | VAL0122977 / SKC 9068232      |
| Position Monitor          | POM-RM1                 | VAL0123032 / SKC 9068249      |
| Hydraulic Pressure Mon.   | HPM-RM1                 | VAL0122850 / SKC 9068256      |
| Optional Temp Monitor     | OTM-RM1                 | VAL0122982 / SKC 9068263      |
| Cover Fronts              | TP-36                   |                               |

**4. CONNECTION DIAGRAM K11, K12, K21, K22****4.1 CONTROL MOTOR POWER Power Supply****K11**

|        |   |   |            |                         |
|--------|---|---|------------|-------------------------|
| CM+U   | 1 | ● | +24-35 Vdc |                         |
| CM+U   | 2 | ● | +24-35 Vdc |                         |
| CM-GND | 3 | ● | 0 V        | (control motor chassis) |
| CM-GND | 4 | ● | 0 V        | (control motor chassis) |

**4.2 CONTROL MOTOR DRIVER Electric stepping Motor****K12**

|        |    |   |                                                                |        |   |
|--------|----|---|----------------------------------------------------------------|--------|---|
| CM+W1A | 1  | ● | Positive, phase 1                                              | Cable: | 1 |
| CM-W1E | 2  | ● | Negative, phase 1                                              |        | 2 |
| CM+W2A | 3  | ● | Positive, phase 2                                              |        | 3 |
| CM-W2E | 4  | ● | Negative, phase 2                                              |        | 4 |
| CM+W3A | 5  | ● | This connection is for a 2-phase stepping motor and a CMD-RM2. |        |   |
| CM-W3E | 6  | ● |                                                                |        |   |
| CM+W4A | 7  | ● |                                                                |        |   |
| CM-W4E | 8  | ● |                                                                |        |   |
| CM+W5A | 9  | ● |                                                                |        |   |
| CM-W5E | 10 | ● |                                                                |        |   |
| CM-GND | 11 | ● |                                                                |        |   |
| CM-GND | 12 | ● | The cable shield is connected to the ground bar below the rack |        |   |

**4.3 RMS POWER Power Supply****K21**

|     |   |   |         |
|-----|---|---|---------|
| Us+ | 1 | ● | +24 Vdc |
| Us+ | 2 | ● | +24 Vdc |
| Us- | 3 | ● | 0 V     |
| Us- | 4 | ● | 0 V     |

**4.4 CONTROL MOTOR INTERFACE Digital inputs and outputs****K22**

|         |   |   |                                      |     |
|---------|---|---|--------------------------------------|-----|
| DI+CMTO | 1 | ● | Digital input, Plates Together       | PLC |
| DI+CMAP | 2 | ● | Digital input, Plates Apart          | PLC |
| DI+CMHS | 3 | ● | Digital input, High Speed            | PLC |
| DI+CMHT | 4 | ● | Digital input, Holding Torque        | PLC |
| DO+CMAL | 5 | ● | Digital output, Stepping Motor Alarm | PLC |
| DO+CM   | 6 | ● | Digital output, Spare                | PLC |

**4. CONNECTION DIAGRAM K31, K32, K33, K41****4.5 VIM and MPM Analog inputs and outputs****K31**

|        |     |                        |                 |
|--------|-----|------------------------|-----------------|
| AO+VIM | 1 ● | Analog output, 4-20 mA | Instrum. system |
| AO-VIM | 2 ● | Analog output, 4-20 mA | Instrum. system |
| AI+MPM | 3 ● | Analog input, 4-20 mA  | Instrum. system |
| AI-MPM | 4 ● | Analog input, 4-20 mA  | Instrum. system |
| AO+MPM | 5 ● | Analog output, 4-20 mA | Instrum. system |
| AO-MPM | 6 ● | Analog output, 4-20 mA | Instrum. system |

**4.6 VIM and MPM Digital outputs****K32**

|         |     |                              |     |
|---------|-----|------------------------------|-----|
| DO+VIM1 | 1 ● | Digital output, VIM, Limit 1 | PLC |
| DO+VIM2 | 2 ● | Digital output, VIM, Limit 2 | PLC |
| DO+MPM1 | 3 ● | Digital output, MPM, Limit 1 | PLC |
| DO+MPM2 | 4 ● | Digital output, MPM, Limit 2 | PLC |

**4.7 VIM Transducer signals****K33**

|        |     |                                                                |                  |
|--------|-----|----------------------------------------------------------------|------------------|
| T+VIM  | 1 ● | Transducer, positive                                           | * : white+brown  |
| T-VIM  | 2 ● | Transducer, negative                                           | * : green+yellow |
| TS-VIM | 3 ● |                                                                |                  |
|        | 4 ● | The cable shield is connected to the ground bar below the rack |                  |

\* K-VIM25, K-VIM25A or K-VIMS25

**4.8 TVD Headset output, Analog outputs, Digital outputs, Digital inputs****K41**

|          |     |                              |                 |
|----------|-----|------------------------------|-----------------|
| AO+TVDHS | 1 ● | Headset output               | Headset         |
| AO-TVDHS | 2 ● | Headset output               | Headset         |
| AO+TVD   | 3 ● | Analog output, 4-20 mA       | Instrum. system |
| AO-TVD   | 4 ● | Analog output, 4-20 mA       | Instrum. system |
| DO+TVD1  | 5 ● | Digital output, Limit 1      | PLC             |
| DO+TVD2  | 6 ● | Digital output, Limit 2      | PLC             |
| DI+LOGA  | 7 ● | Digital input, Low Gain      | PLC             |
| DO+MPM3  | 8 ● | Digital output, Limit 3, MPM | PLC             |

**4. CONNECTION DIAGRAM K42, K43, K44****4.9 TVD****Transducer signals, Sync input,  
Spare output****K42**

|         |     |                                                                |                        |
|---------|-----|----------------------------------------------------------------|------------------------|
| T+TVD   | 1 ● | Transducer, positive                                           | * : white+brown        |
| T-TVD   | 2 ● | Transducer, negative                                           | * : green+yellow       |
| TS-TVD  | 3 ● | The cable shield is connected to the ground bar below the rack |                        |
| T+TVDS  | 4 ● | Sync. input, positive                                          | Not used               |
| T-TVDS  | 5 ● | Sync. input, negative                                          | Not used               |
| AO+TVDA | 6 ● | Analog output, spare                                           | Not used               |
| AO-TVDA | 7 ● | Analog output, spare                                           | Not used               |
|         | 8 ● |                                                                | * K-TVDT25 or K-TVDS25 |

**4.10 LDU****Digital inputs and outputs****K43**

|          |     |                                           |          |
|----------|-----|-------------------------------------------|----------|
| DI+LDU1  | 1 ● | Digital input, (DI-TPMA) RMC Touch Point  | PLC      |
| DI+LDU2  | 2 ● | Digital input, LDU 2                      | Not used |
| DO+LDU3  | 3 ● | Digital output, (DO+RMCRD) RMC Ready      | PLC      |
| DO+LDU4  | 4 ● | Digital output, (DO+RMCPSP) RMC Start Pos | PLC      |
| DO+LDURD | 5 ● | Digital output, LDU Ready                 | PLC      |
| ID+SCI1  | 6 ● | Digital output, Serial Com. Interface     | Not used |
| ID+SCI2  | 7 ● | Digital output, Serial Com. Interface     | Not used |
| ID-SCI   | 8 ● | Digital output, Serial Com. Interface     | Not used |

**4.11 LDU****Digital inputs and outputs****K44**

|         |     |                                    |                          |
|---------|-----|------------------------------------|--------------------------|
| DI+FGRE | 1 ● | Digital input, Feed Guard Reset    | PLC                      |
| DO+FGCO | 2 ● | Digital output, Feed Guard Contact | PLC                      |
| DO+FGAL | 3 ● | Digital output, Feed Guard Alarm   | PLC                      |
| ID+PDU1 | 4 ● | Serial output                      | 4 (see below)            |
| ID+PDU2 | 5 ● | Serial input                       | 5                        |
| ID-PDU  | 6 ● | Serial common                      | 6                        |
| U+PDU   | 7 ● | Power supply, +24V                 | 7                        |
| U-PDU   | 8 ● | Power supply, 0V,                  | 8                        |
|         |     | Socket                             | Cable K-PDU3             |
|         |     | 4                                  | white                    |
|         |     | 5                                  | brown                    |
|         |     | 6                                  | green+shield             |
|         |     | 7                                  | yellow                   |
|         |     | 8                                  | grey                     |
|         |     |                                    | Cable to Operators panel |
|         |     |                                    | white                    |
|         |     |                                    | brown                    |
|         |     |                                    | green                    |
|         |     |                                    | not connected            |
|         |     |                                    | not connected            |

**4. CONNECTION DIAGRAM K51, K52, K53, K54****4.12 POM****Transducer signals****K51**

|        |     |                                                                |                 |
|--------|-----|----------------------------------------------------------------|-----------------|
| TI-POT | 1 ● | Transducer, input positive                                     | K-POT25: white  |
| TI+POT | 2 ● | Transducer, input negative                                     | K-POT25: brown  |
| TE-POT | 3 ● | Transducer, input common                                       | K-POT25: green  |
| TE+POT | 4 ● | Transducer (not used)                                          | K-POT25: yellow |
| TR+POT | 5 ● | Transducer, excitation positive                                | K-POT25: grey   |
| TM+POT | 6 ● | Transducer, excitation negative                                | K-POT25: rose   |
| TS-POT | 7 ● | (switch white and brown for reversed indication)               |                 |
|        | 8 ● | The cable shield is connected to the ground bar below the rack |                 |

**4.13 POM****Analog outputs, Digital outputs****K52**

|         |     |                             |                 |
|---------|-----|-----------------------------|-----------------|
| AO+POM  | 1 ● | Analog output, POM, 4-20 mA | Instrum. system |
| AO-POM  | 2 ● | Analog output, POM, 4-20 mA | Instrum. system |
| DO+POM1 | 3 ● | Digital output, POM Limit 1 | PLC             |
| DO+POM2 | 4 ● | Digital output, POM Limit 2 | PLC             |
| DO+POM3 | 5 ● | Digital output, POM Limit 3 | PLC             |
|         | 6 ● |                             |                 |

**4.14 HPM****Transducer signals****K53**

|         |     |                                                                |  |
|---------|-----|----------------------------------------------------------------|--|
| T+HPMA  | 1 ● | Transducer, A-Chamber, positive                                |  |
| T-HPMA  | 2 ● | Transducer, A-Chamber, negative                                |  |
| TS-HPMA | 3 ● | The cable shield is connected to the ground bar below the rack |  |
| T+HPMB  | 4 ● | Transducer, B-Chamber, positive                                |  |
| T-HPMB  | 5 ● | Transducer, B-Chamber, negative                                |  |
| TS-HPMB | 6 ● | The cable shield is connected to the ground bar below the rack |  |

**4.15 HPM****Analog outputs, Digital outputs****K54**

|         |     |                               |                 |
|---------|-----|-------------------------------|-----------------|
| AO+HPA  | 1 ● | Analog output, HPM-A, 4-20 mA | Instrum. system |
| AO-HPA  | 2 ● | Analog output, HPM-A, 4-20 mA | Instrum. system |
| AO+HPB  | 3 ● | Analog output, HPM-B, 4-20 mA | Instrum. system |
| AO-HPB  | 4 ● | Analog output, HPM-B, 4-20 mA | Instrum. system |
| DO+HPA1 | 5 ● | Digital output, HPM-A Limit 1 | PLC             |
| DO+HPA2 | 6 ● | Digital output, HPM-A Limit 2 | PLC             |
| DO+HPB1 | 7 ● | Digital output, HPM-B Limit 1 | PLC             |
| DO+HPB2 | 8 ● | Digital output, HPM-B Limit 2 | PLC             |

**4. CONNECTION DIAGRAM K61, K62, K63, K64****4.16 OTM 1 Transducer signals****K61**

|          |     |                              |
|----------|-----|------------------------------|
| T+OTM11  | 1 ● | Transducer 1-1, positive     |
| T-OTM11  | 2 ● | Transducer 1-1, compensation |
| TS-OTM11 | 3 ● | Transducer 1-1, negative     |
| T+OTM12  | 4 ● | Transducer 1-2, positive     |
| T-OTM12  | 5 ● | Transducer 1-2, compensation |
| TS-OTM12 | 6 ● | Transducer 1-2, negative     |

The cable shield is connected to the ground bar below the rack

**4.17 OTM 1 Analog outputs, Digital outputs****K62**

|          |     |                              |                 |
|----------|-----|------------------------------|-----------------|
| AO+OTM11 | 1 ● | Analog output 1-1, 4-20 mA   | Instrum. system |
| AO-OTM11 | 2 ● | Analog output 1-1, 4-20 mA   | Instrum. system |
| AO+OTM12 | 3 ● | Analog output 1-2, 4-20 mA   | Instrum. system |
| AO-OTM12 | 4 ● | Analog output 1-2, 4-20 mA   | Instrum. system |
| DO+OTM11 | 5 ● | Digital output, 1-1, Limit 1 | PLC             |
| DO+OTM12 | 6 ● | Digital output, 1-1, Limit 2 | PLC             |
| DO+OTM13 | 7 ● | Digital output, 1-2, Limit 1 | PLC             |
| DO+OTM14 | 8 ● | Digital output, 1-2, Limit 2 | PLC             |

**4.18 OTM 2 Transducer signals****K63**

|          |     |                              |
|----------|-----|------------------------------|
| T+OTM21  | 1 ● | Transducer 2-1, positive     |
| T-OTM21  | 2 ● | Transducer 2-1, compensation |
| TS-OTM21 | 3 ● | Transducer 2-1, negative     |
| T+OTM22  | 4 ● | Transducer 2-2, positive     |
| T-OTM22  | 5 ● | Transducer 2-2, compensation |
| TS-OTM22 | 6 ● | Transducer 2-2, negative     |

The cable shield is connected to the ground bar below the rack

**4.19 OTM 2 Analog outputs, Digital outputs****K64**

|          |     |                              |                 |
|----------|-----|------------------------------|-----------------|
| AO+OTM21 | 1 ● | Analog output 2-1, 4-20 mA   | Instrum. system |
| AO-OTM21 | 2 ● | Analog output 2-1, 4-20 mA   | Instrum. system |
| AO+OTM22 | 3 ● | Analog output 2-2, 4-20 mA   | Instrum. system |
| AO-OTM22 | 4 ● | Analog output 2-2, 4-20 mA   | Instrum. system |
| DO+OTM21 | 5 ● | Digital output, 2-1, Limit 1 | PLC             |
| DO+OTM22 | 6 ● | Digital output, 2-1, Limit 2 | PLC             |
| DO+OTM23 | 7 ● | Digital output, 2-2, Limit 1 | PLC             |
| DO+OTM24 | 8 ● | Digital output, 2-2, Limit 2 | PLC             |

**4. CONNECTION DIAGRAM K71, K72, K73, K74****4.20 EX 1 Not used****K71**

|        |   |   |
|--------|---|---|
| EX-711 | 1 | ● |
| EX-712 | 2 | ● |
| EX-713 | 3 | ● |
| EX-714 | 4 | ● |
| EX-715 | 5 | ● |
| EX-716 | 6 | ● |

**4.21 EX 1 Not used****K72**

|        |   |   |
|--------|---|---|
| EX-721 | 1 | ● |
| EX-722 | 2 | ● |
| EX-723 | 3 | ● |
| EX-724 | 4 | ● |
| EX-725 | 5 | ● |
| EX-726 | 6 | ● |
| EX-727 | 7 | ● |
| EX-728 | 8 | ● |

**4.22 EX 2 Not used****K73**

|        |   |   |
|--------|---|---|
| EX-731 | 1 | ● |
| EX-732 | 2 | ● |
| EX-733 | 3 | ● |
| EX-734 | 4 | ● |
| EX-735 | 5 | ● |
| EX-736 | 6 | ● |

**4.23 EX 2 Not used****K74**

|        |   |   |
|--------|---|---|
| EX-741 | 1 | ● |
| EX-742 | 2 | ● |
| EX-743 | 3 | ● |
| EX-744 | 4 | ● |
| EX-745 | 5 | ● |
| EX-746 | 6 | ● |
| EX-747 | 7 | ● |
| EX-748 | 8 | ● |

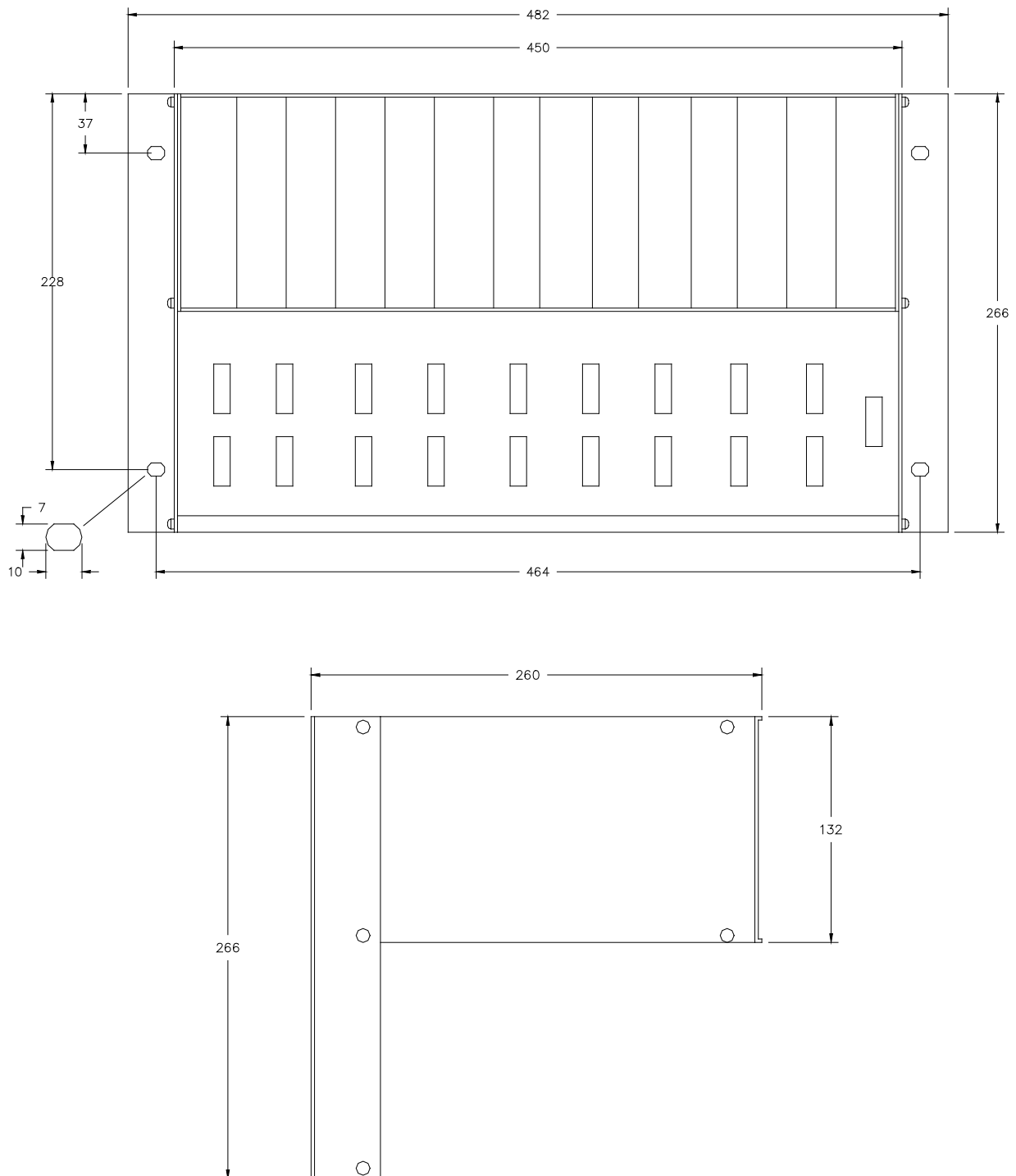
**4. CONNECTION DIAGRAM K75, K76****4.24 EX 3 Not used****K75**

|        |   |   |
|--------|---|---|
| EX-751 | 1 | ● |
| EX-752 | 2 | ● |
| EX-753 | 3 | ● |
| EX-754 | 4 | ● |
| EX-755 | 5 | ● |
| EX-756 | 6 | ● |

**4.25 EX 3 Not used****K76**

|        |   |   |
|--------|---|---|
| EX-761 | 1 | ● |
| EX-762 | 2 | ● |
| EX-763 | 3 | ● |
| EX-764 | 4 | ● |
| EX-765 | 5 | ● |
| EX-766 | 6 | ● |
| EX-767 | 7 | ● |
| EX-768 | 8 | ● |

## 5. OUTLINE DRAWING



## 6. CONNECTION DRAWING

