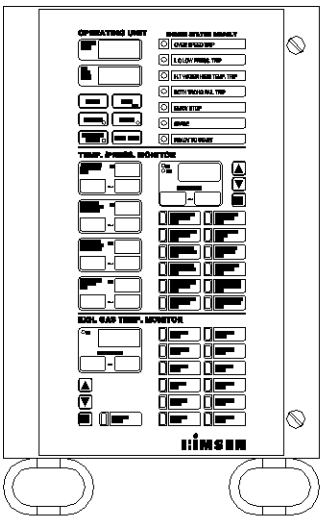
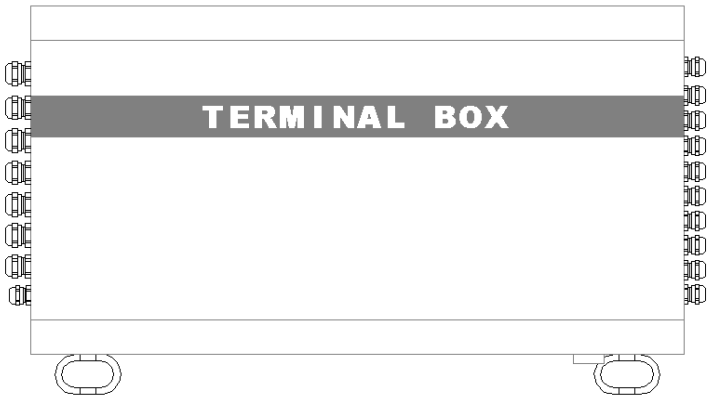
REV 8 - 2015-06-11

G/E AUTOMATIC CONTROL SYSTEM MANUAL





KOMECO

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PART 1. GENERAL

PART 2. FUNCTION EXPLANATION

PART 3. TROUBLE SHOOTING

PART 4. SETTING

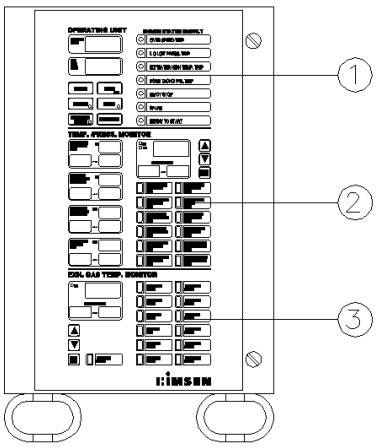
KOMECO

ENG. TYPE	GENERAL	PART1
Standard		1/18

1. GENERAL

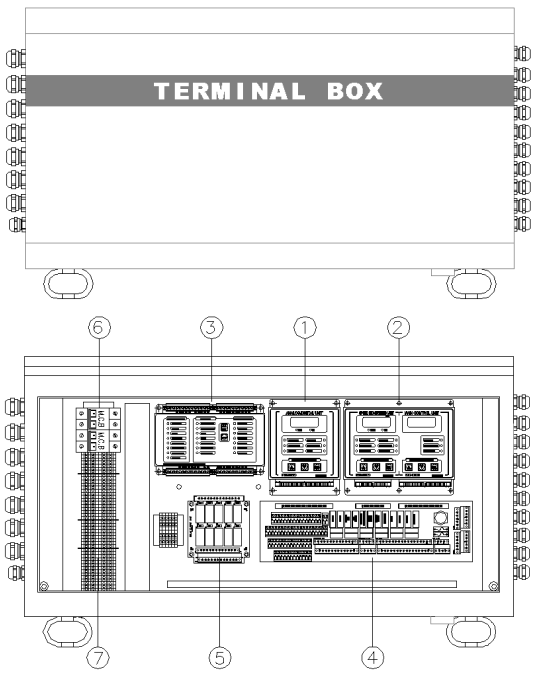
1-1 SYSTEM CONFIGURATION

This is a Control & monitoring & Safety System for H17/28,H21/32,H25/33,H32/40 Generator engine control which consist of a terminal Box as below figure 1.



Monitoring box

1) Operating unit(OPU-10)
2) Temp. & Press. Monitor(MTP-12CA)
3) Exh. Gas Temp. Monitor(ETM-12CA)



Terminal box

1) Analog / Digital unit.
   (Symbol : U1, Remarks : ADU-36-TCP)
2) Speed monitoring & Main control unit.
   (Symbol : U2 & U3,
   Remarks : SMU-08-SC / MCU-56-DIO)
3) Safety control & Cable supervision unit.
   (Symbol : U4, Remarks : SCCS-4-8)
4) Main terminal board.
   (Symbol : P1, Remarks : M-TB)
5) Relay output unit.
   (Symbol : P4, Remarks : ROU)
6) MCB.
7) Terminal block.

FIGURE 1. Monitoring & Terminal box

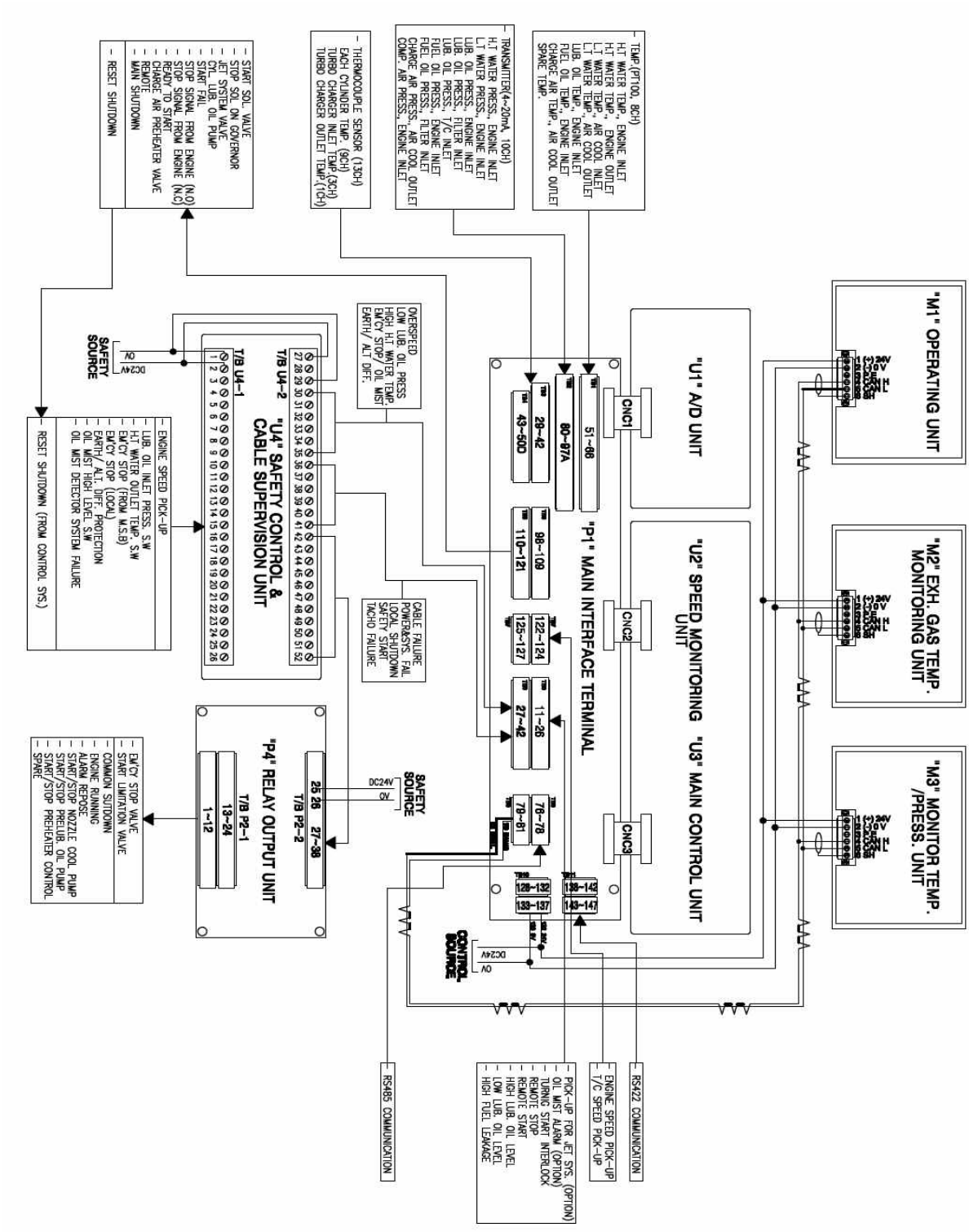


FIGURE 2. SYSTEM INTERFACE LAYOUT-2

▶ Monitoring box

Monitoring box is consist of the following modules :

- Operating unit(OPU-10)
- Temperature & Pressure Monitor unit(MTP-12CA)
- Exhaust gas temperature Monitor unit(ETM-12CA)

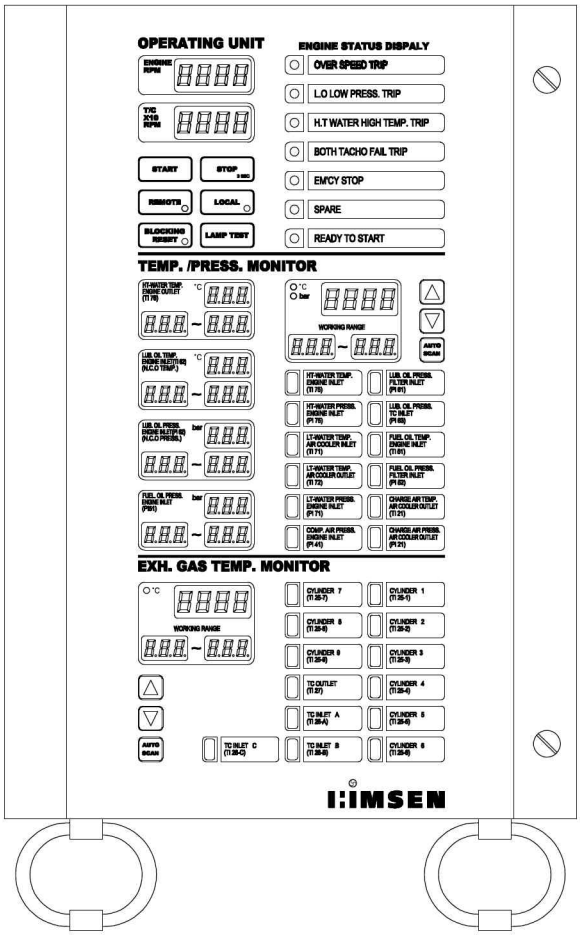
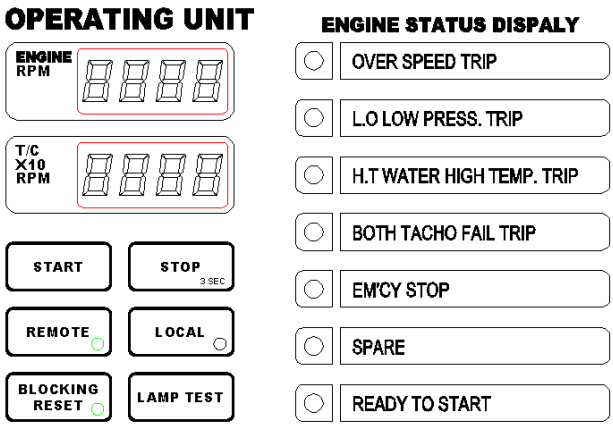


FIGURE 3. MONITORING BOX



GENERAL SPEC.

1. MAKER : KOMECO
2. MODEL : OPERATING UNIT(OPU-10)
3. INPUT
   - CAN BUS FOR INTERNAL COMMUNICATION.
4. DISPLAY
   - 4 DIGITS, 7 SEGMENT LED 2EA
   - 7 STATUS LED
5. FUNCTION
   - START, STOP(3sec DELAY), LAMP TEST, REMOTE, LOCAL, BLOCKING RESET.

FIGURE 4. OPU-10 UNIT

< Operating unit(OPU-10) FIGURE 4. >

1. Description:

The operating unit(OPU-10) has two engine rpm and T/C rpm display FNDs, Indication LEDs that display 7 signals of engine status.

This product communicates with the MCU-56-DIO unit by CAN bus.

The MCU-56-DIO unit transmits engine rpm, T/C rpm(x10rpm), 7 signals of Engine status into the OPU-10 by CAN bus and the OPU-10 displays received data.

2. Function:

- LAMP TEST : Check malfunction of ENG., T/C FND. and 7 LED. of Engine status
- ENGINE CONTROL KEY : If remote, local or blocking/reset key is pushed, LED side of key and will be turned on.

(NOTE1: Local stop push button must be activated at least 3sec, before the engine will stop.)

(NOTE2: Remote, local and blocking/reset have self-holding function. So, If the OPU-10 is powered on, remote, local and blocking/reset will be returned by status before power off.)

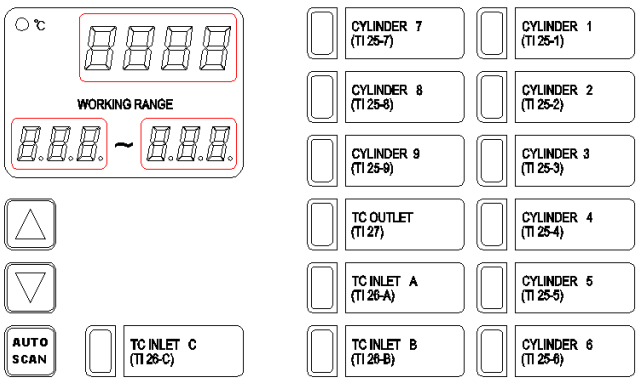
(NOTE3: The manual start button must be activated until ignition takes place.
If the engine have been without pre-lubrication in more than 20minutes the engine can not be electrical started.)

(NOTE4: In case of "BLOCKING RESET" position, the engine can not be started from local or from remote)

(NOTE5: The stop function is depended of the "REMOTE" and "LOCAL" position.)

- INDICATION FND : ENGINE RPM , TURBOCHARGER RPM.
- INDICATION LED : OVERSPEED TRIP, L.O LOW PRESS. TRIP, H.T WATER HIGH TEMP. TRIP, BOTH TACHO FAIL TRIP, EM'CY STOP, OIL MIST HIGH DENSITY TRIP, READY TO START.

EXH. GAS TEMP. MONITOR



GENERAL SPEC.

1. MAKER : KOMECO
2. MODEL : EXH. GAS TEMP. MONITORING UNIT (ETM-12CA)
3. INPUT
   - CAN BUS FOR INTERNAL COMMUNICATION.
4. DISPLAY
   - 4 DIGITS, 7 SEGMENT LED 1EA
   - 3 DIGITS, 7 SEGMENT LED 2EA
   - 13CH. RECTANGLE LED (CYLINDER 1~9, T/C INLET A,B,C, T/C OUTLET)

FIGURE 5. ETM-12CA UNIT

< exhaust gas temperature monitor (ETM-12CA) FIGURE 5.>

1. Description:

The exhaust gas temperature monitor (ETM-12CA) unit is composed of 13ea rectangular LEDs, (cylinder1~9, T/C inlet, T/C outlet), temperature and working range display FND, channel select/auto scan push buttons.

This product communicates with the ADU-36-TCP unit by CAN bus and receive each channel exhaust gas temperature data.

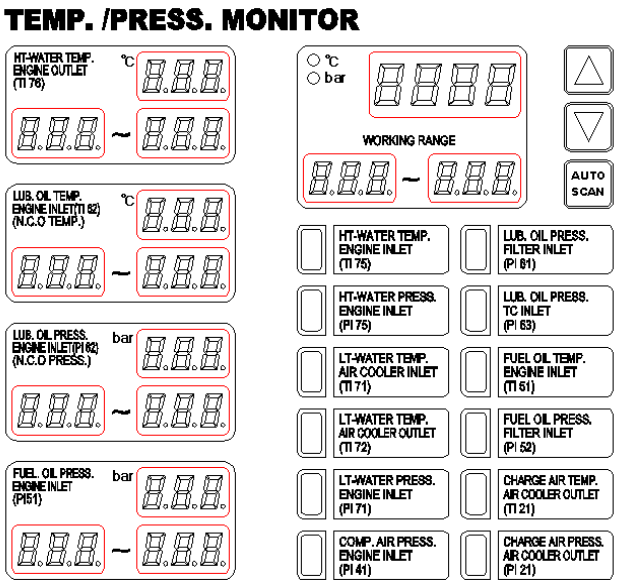
2. Function:

- UP KEY: Arrow upward confirms normal condition of LED by pressing arrow upward and arrow downward, at once or confirm channel sequentially from upper.
- DOWN KEY : Arrow downward confirms normal condition of LED by pressing arrow upward and arrow downward, at once or confirm channel sequentially from lower.
- AUTO SCAN KEY : "AUTO SCAN" scans from right, sequentially without control of arrow upward / downward.

(NOTE1 : If you move channel which is able to confirm with "arrow up" or "arrow down" push button, the analog signal is indicated on the left top 7-segment.

And the currently selected band of analog signal is indicated on the lower 7-segment.)

(NOTE2 : If you use the auto scan key, the signal of channel is indicated sequentially from the right top rectangle LED.)



GENERAL SPEC.

① MAKER : KOMECO
② MODEL : TEMP. & PRESS. MONITOR UNIT (MTP-12CA)
③ INPUT
- CAN BUS FOR INTERNAL COMMUNICATION.
④ DISPLAY
- 4 DIGITS, 7 SEGMENT LED 1EA
- 3 DIGITS, 7 SEGMENT LED 14EA
- RECTANGULAR LED 12EA

FIGURE 6. MTP-12CA UNIT

< Temperature & Pressure Monitor (MTP-12CA) FIGURE 6.>

1. Description:

The temperature & pressure monitor unit is composed of 12ea rectangular LEDs, temperature/ pressure and working range display FND, channel select/auto scan push buttons. This product communicates with the ADU-36-TCP unit by CAN bus and receive each channel temperature and pressure data.

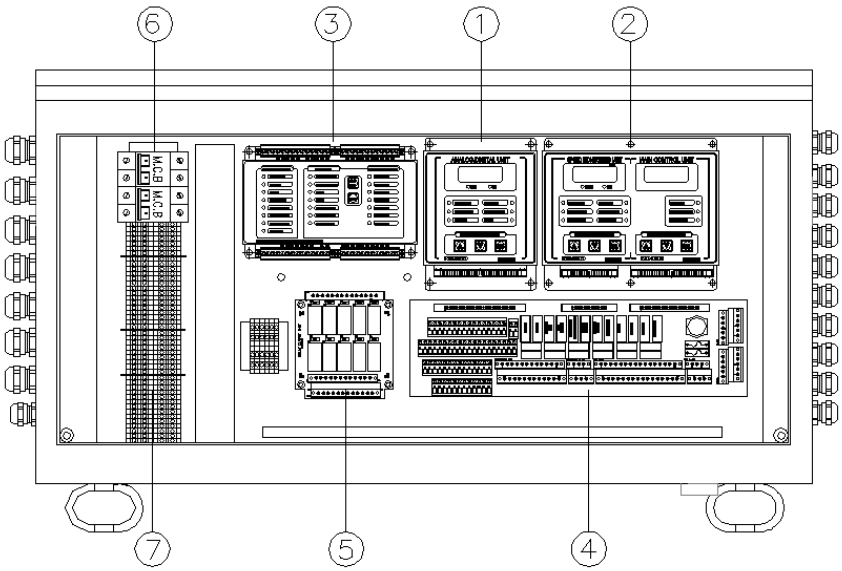
2. Function:

- UP KEY: Arrow upward confirms normal condition of LED by pressing arrow upward and arrow downward, at once or confirm channel sequentially from upper.
- DOWN KEY : Arrow downward confirms normal condition of LED by pressing arrow upward and arrow downward, at once or confirm channel sequentially from lower.
- AUTO SCAN KEY : “AUTO SCAN” scans from right, sequentially without control of arrow upward / downward.

(NOTE1 : If you move channel which is able to confirm with “arrow up” or “arrow down” push button, the analog signal is indicated on the left top 7-segment.
And the currently selected band of analog signal is indicated on the lower 7-segment.
(NOTE2 : If you use the auto scan key, the signal of channel is indicated sequentially from the right top rectangle LED.)

▶ Terminal box (Control system , Safety system)

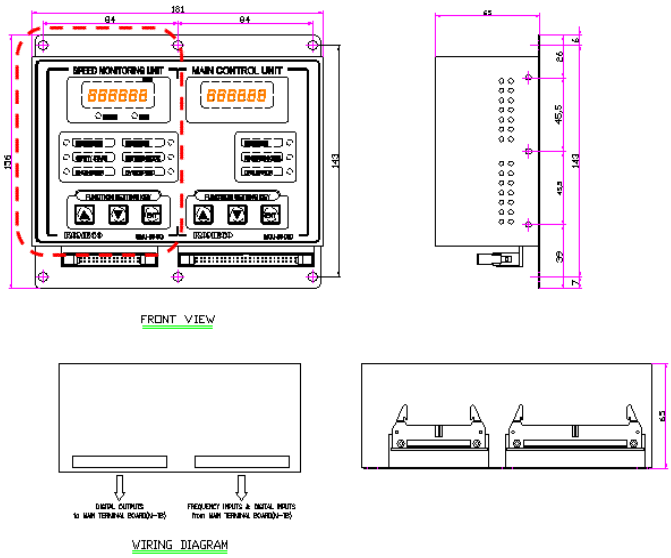
Terminal box is composed of Analog / Digital unit, Speed measuring & Main control unit, Main terminal board for “Control system” and Safety control & Cable supervision unit, Relay output unit, for “Safety system”.



① Analog / Digital unit. (Symbol : U1, Remarks : ADU-36-TCP)
② Speed monitoring & Main control unit. (Symbol : U2 & U3, Remarks : SMU-08-SC / MCU-56-DIO)
③ Safety control & Cable supervision unit. (Symbol : U4, Remarks : SCCS-4-8)
④ Main terminal board. (Symbol : P1, Remarks : M-TB)
⑤ Relay output unit. (Symbol : P4, Remarks : ROU)
⑥ Magnetic circuit breaker. (MCB)
⑦ Conta-clip terminal block.

FIGURE 7. TERMINAL BOX

▶ Terminal box (Control system part)



GENERAL SPEC.

① MAKER : KOMECO
② MODEL : SPEED MONITORING UNIT
(SMU-08-SC)
③ INPUT
- ENG. : SQURE & SINE WAVE
(0~1600 / 0~10khz, Power : +12V)
- T/C : SQURE & SINE WAVE
(0~60000 / 0~2khz, Power : +12V)
④ COMMUNICATION
- CAN BUS FOR INTERNAL COMMUNICATION
⑤ DISPLAY
- 6 DIGITS, 7 SEGMENT LED 2EA
- 8 STATUS LED

FIGURE 8. SMU-08-SC

< Speed monitoring control unit(SMU-08-SC) FIGURE 8.>

1. Description:

The speed monitoring control unit is composed of 8ea status LEDs, engine/turbocharger RPM display FND, push buttons of usable engine / turbo charger select.

A engine and turbo charger pick-up sensor are connected to this unit.

And this unit transfers a electrical signal into a engineering value and sends this value to a main control unit(MCU-56-DIO) through interlink CAN bus.

2. Function:

- Pick-up input: This is inputted two pick-up sensor for engine and T/C. The engine pick-up input has sensor open detection function and the T/C pick-up input doesn't has it
: Engine pick-up sensor type: SPS-02(maker: KUMOH)
T/C pick-up sensor type: KBB
- Communication: This unit is using CAN communication method.
CAN: This method is used for transmission of RPM and engine status data into the MCU-56-DIO.

3. Operation:

① This unit can be set as follows information.
- Turbocharger/engine teeth.
- Turbocharger maximum RPM.
- Overspeed RPM, Running ON/OFF RPM

- Soft. group
- Modbus setting

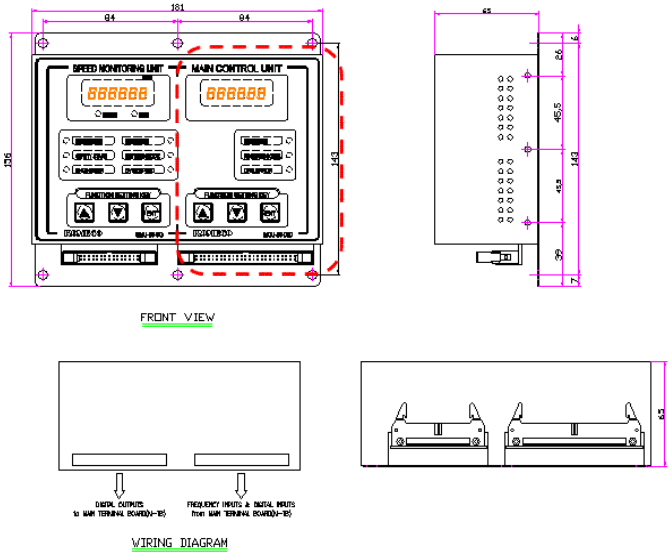
② This unit is inputted signal for start-fail and ready-to-start through the MCU-55-DIO unit and transmit its data into the OPU-10 unit.

③ Logic sequence

- OVERSPEED (Normal Open)
  1) ON: RPM >Setting RPM
  2) OFF: 0 RPM + 5SEC
- ENG. RUNNING (Normal Open)
  1) ON: When the engine reaches running rpm(setting rpm) or over 200 rpm for 10 sec.
  2) OFF: After running on, when rpm is below running off rpm (setting rpm).
     When rpm is below running off rpm (200 rpm).
- PRIME LUB. OIL PUMP ON (Normal Open)
  1) ON : RPM = < 200 rpm
  2) OFF: RPM >500 rpm or engine running condition.
- START LIMIT ATION(Normal Open)

  Start limit signal limit starting fuel using turning on a starting limit sol. valve.
  1) ON: RPM > 25 rpm.
  2) OFF: Engine running condition.
- JACKET WATER PREHEATER OFF (Normal Open)

  A Jacket Water preheater heats high temp. water.
  1) ON: RPM =< 200 rpm
  2) OFF: Engine running rpm



GENERAL SPEC.

① MAKER : KOMECO
② MODEL : MAIN CONTROL UNIT
(MCU-56-DIO)
③ INPUT
- BINARY 24EA
④ OUTPUT
- DRY CONTACT : 12EA PHOTO COUPLER
(MAX. : 20mA)
⑤ COMMUNICATION
- CAN BUS FOR INTERNAL COMMUNICATION.
RS485/422 COMMUNICATION TO A.M.S
⑥ DISPLAY
- 6 DIGITS, 7 SEGMENT LED
- 3 STATUS LED

FIGURE 9. MCU-56-DIO

< Main control unit(MCU-56-DIO) FIGURE 9.>

1. Description:

The MCU-56-DIO unit receives data rpm data from the SMU-08-SC and analog data from the ADU-36-TCP by CAN communication. So this unit uses data received and inputted from the engine side level sensors for engine sequence control.

2. Function:

- Input: 24 channel, Input parts are consisted by photo-coupler
- Output: 12 channel, Output parts are consisted by photo-coupler of open collector type
- Communication: This unit is using CAN communication method.
- The self test LED is flickering at normal condition and is stopped when a following condition.
  : Safety module failure
  : ADU,SMU module failure

3. Operation:

- This unit is operated as follows operation:
  1) Ready to start condition
  2) Local & remote start and stop
  3) Start fail.
  4) Stop fail.
  5) Jet system control
  6) Tacho fail.

1) READY TO START CONDITION

When below ready to start condition is satisfied, the engine will be started.

① Turning bar disengage

② Not in engine stop condition

③ Not prelub. oil low level (prelub. oil pump is running)

④ Engine stationery (safety start)

⑤ Not blocking push-button signal

⑥ Not tacho fail. signal

2) LOCAL/REMOTE/BLOCKING MODE SELECTION

The engine control mode can be selected by pushing one of local, remote and blocking push buttons on the front side of the OPU-10 unit. The engine can be started only under the selected mode.(Exception Blocking/reset mode)

3) ENGINE START

If ready to start condition is satisfied, the engine can be started by pushing the start button.

- LOCAL START

  The engine can be started by pushing the start button on front-side of the OPU-10.

- REMOTE START

  The engine can be started by pushing the start button on the outside of the engine(A.M.S)

4) START FAIL

After the engine was started, If one of the following conditions is occurred, the control system will generate the start fail. alarm.



After the engine stops completely. The failure condition is removed automatically after 30sec.

① The engine fails to reach 50 rpm within 5 seconds after engine starting.

② The engine fails to reach engine running state within 20 seconds(or set time) after engine starting.

5) ENGINE STOP

If one of the following condition is occurred, the control system drives stop Sol. valve on the Governor for the engine stopping.

① Pushing local/remote stop push button, regardless of control mode.

② Common trip(automatic stop)

6) STOP FAIL. FUNCTION

After the stop sol valve was activated, if the engine isn't condition of running off within 30 sec, the control system generates stop fail. alarm and the safety system drives EM'CY SOL. valve for engine stopping.

After the engine stops completely, the stop failure condition is removed.

7) JET ASSISTANCE SYSTEM CONTROL FUNCTION

This function was created in order to improve the acceleration behavior of an engine without at the same time causing a deterioration in its sot behavior. The jet-assist function is needed in any engine plant with an acceleration behavior outside the standard acceleration ramp.

The increase in the turbocharger speed this requires (lack of exhaust-gas output to power the turbocharger) is achieved by feeding starting air to the compressor wheel via an adjustable pressure reducer.

The control system is active up to an adjustable charge-air pressure. The jet-assist control is activated by a sudden raise in the demand for load, which equivalent to a sharp increase in output.

① Not overspeed condition

② Not start fail.

③ Not engine stopping

④ Not prelub. oil low level

(7-1) When the engine is started

The engine starts and reaches or exceeds 50 rpm, if a jet pick-up signal of the lambda controller is activated, Then the system drives jet SOL. valve to supply more air to the T/C. If the signal is removed, jet system stops and jet SOL. valve is closed. If the pick-up signal for Jet assistance continues for 6 seconds or over, The control system shuts down Jet SOL. valve and generates jet system fail. alarm. Then the alarm is sent to E.C.C, informing the occurrence of jet system failure to the operator.

(7-2) When the engine is running

In cases that all precautions listed above are satisfied and that Engine is running, if a jet pick-up signal of the lambda controller is activated, Then the system drives jet SOL. valve. and more air is

supplied to the T/C. If the signal is removed, jet system shuts down jet SOL. valve as it stops. If the signal continues for more than 10 seconds,

The control system shuts down jet SOL. valve and generates jet system fail. alarm.

The alarm is sent to E.C.C, informing the occurrence of jet system failure to the operator.

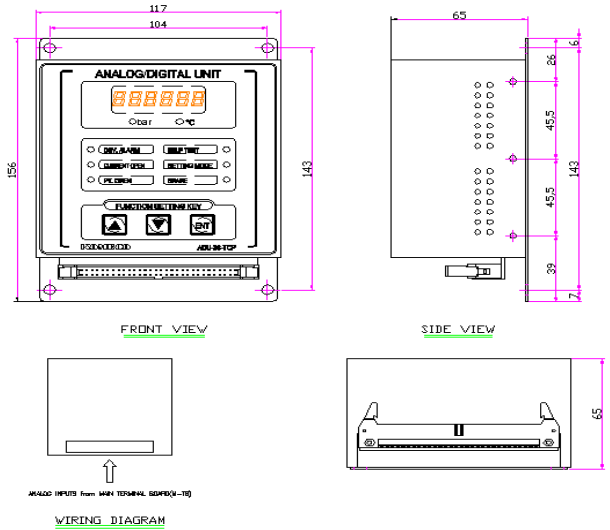
8) TACHO FAIL FUNCTION

If a speed pick-up sensor cable is disconnected, the tacho-fail alarm is occurred.

9) SHUTDOWN FUNCTION

In order to display the engine shut-down status on the OPU-10 unit, This unit is inputted signal related shut-down through the safety control unit and transmit data for shut-down into the OPU-10 unit. Shut-down condition as follows :

- Overspeed trip, L.O Low press. trip, H.T water high temp. trip, OMD High density trip(option), Alt. differential(option),Main bearing high temp. trip(option)



GENERAL SPEC.

① MAKER : KOMECO
② MODEL : ANALOG & DIGITAL UNIT. (ADU-36-TCP)
③ INPUT
- T/C : 13EA, 2WIRE ANALOG INPUTS (RANGE : 0~800℃)
- 4~20mA : 10EA, 2WIRE ANALOG INPUTS INPUT IMPEDANCE : 100Ω POWER FOR TRANSMITTER : 24VDC
- PT100 : 8EA, 2WIRE ANALOG INPUTS

④ COMMUNICATION
- CAN BUS FOR INTERNAL COMMUNICATION

⑤ DISPLAY
- 6 DIGITS, 7 SEGMENT LED
- 8 STATUS LED

FIGURE 10. ADU-36-TCP

< Analog to digital unit(ADU-36-TCP) FIGURE 10.>

1. Description:

The ADU-36-TCP unit scans all analog sensor on the engine and transfers a electrical signal into a engineering value and sends this value to a MCU-56-DIO, ETM-12CA, MTP-12CA unit through interlink CAN bus. And then, ETM-12CA, MTP-12CA displays received data.

(Thermal-couplers 13CH., 4~20mA 10CH. and PT-100 8CH.)

2. Function:

- Thermal-coupler Input: 13CH.
- 4~20mA Input: 10CH.
- PT-100 input: 8CH.
- Sensor open detection.
- Deviation alarm.
- Communication: This unit is using CAN communication method.

3. Operation:

This unit is operated as follows operation

① Thermal-couple Input: This unit uses 13CH. Thermal-coupler Input. The temperature range is 0℃ ~ 800℃ and cold junction compensation is compensated by the PT-100 on the main interface terminal PCB.

② 4~20mA input: This unit uses 10CH. 4~20mA current input. Sensor signals are as follows. HT water press., LT water press., LUB. Oil press., Fuel oil press., Charge air press., Compressed air press.

③ PT100Ω input: This unit uses 8CH. PT100Ω input. Sensor signals are as follows. HT water temp., LT water temp., LUB. Oil temp., Fuel oil temp., Charge air temp.

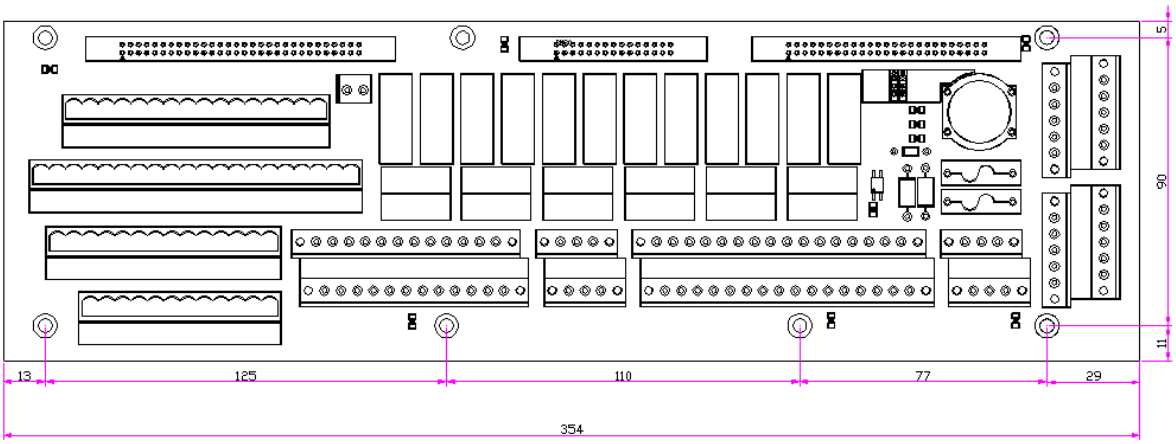


FIGURE 11. M-TB

< MAIN TERMINAL BOARD(M-TB) FIGURE 11.>

1. Description:

This unit is main terminal board and it composed of terminal block for signal interface, relay(RY610024, TYCO社) for MCU-56-DIO digital out, spark quenchers for relay contact protection for spark.

This unit is connected with ADU-36-TCP, MCU-56-DIO, SMU-08-SC unit by flat cable,

and kind of Interface signal is as follows :

- Analog signal interface(to ADU unit)
  - ① 13channel Thermo couple signal.
  - ② 10channel Sink current(4~20mA) signal.
  - ③ 8channel PT100 signal.
  - ④ 1channel PT100 sensor for temperature compensation.
- Digital input/output interface.(to MCU unit)
- Engine, T/C RPM signal(to SMU unit)
- RS485/422(master & redundancy), CAN communication interface.

▶ Terminal box (Safety system part)

The safety system is an independent system for monitoring and controlling the GEN SET' shutdown function.

< Safety control unit(SCCS-4-8) FIGURE 13>

1. Description:

The SCCS-4-8 unit is used by safety control and measures frequencies from a engine pick-up sensors and outputs relay outputs related to engine logic sequence for engine rpm.

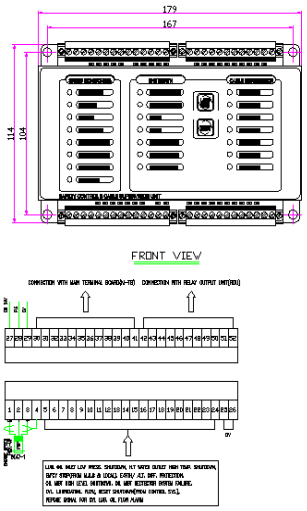
Its output is connected with the main interface terminal PCB. And this unit is

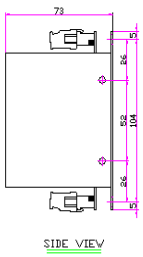
Inputted shutdown signal and if shut-down is occurred, EM'CY SOL relay will be operated.

So this unit has function to check shut-down cable open.

2. function:

- Input: 19 channel, Input parts are consisted by relay of N.O type
- Output: 20 channel, Output parts are consisted by relay of N.O type.





GENERAL SPEC.

① MAKER : KOMECO
② MODEL : SAFETY CONTROL & CABLE SUPERVISION UNIT. (SCCS-4-8)
③ INPUT : Relay input 19EA (Digital input 12EA, Digital input with cable supervision 7EA)
④ OUTPUT
- DRY CONTACT : RELAY OUTPUT 20EA
⑤ DISPLAY
- 8 MONITORING STATUS LED
- 7 CABLE STATUS LED
- 7 SHUTDOWN STATUS LED

FIGURE 13. SCCS-4-8

3. OPERATION:

- Safety unit is operated by below function to protect the engine.
  ① Automatic stop
  ② Remote / manual emergency stop
  ③ Open circuit monitor

③ Alarm blocking

1) AUTOMATIC STOP FUNCTION

If engine works abnormally to be possibly damaged, the function of automatic stop for safety system automatically drives both emergency stop sol.(safety system) valve and stop sol (Control system). valve of speed governor, stopping the engine and ultimately protecting it.

The OPU-10 unit indicates EM'CY stop LED and the alarm relay unit engages related relays for informing the abnormal condition of engine. After Engine is completely stopped, if the cause of its trouble is removed, pushing the blocking/Reset Push Button on the OPU-10 unit will be removed alarms related to automatic stop.

Automatic stop condition:

① Overspeed.
② Low lub. oil pressure.
③ High H.T water temperature.
④ Oil mist high density.(option)
⑤ Alt. Diff./earth protection(option)
⑥ Emergency stop.

2) REMOTE MANUAL EMERGENCY STOP FUNCTION

The remote manual emergency stop drives both emergency stop sol.(safety system) valve and stop sol. (Control system) valve on the speed governor and the engine will be stopped.

The OPU-10 unit indicates EM'CY stop LED and the alarm relay unit engages related relays. After Engine is completely stopped, if remote manual emergency stop condition is removed, pushing the blocking/Reset Push Button on the OPU-10 unit will be removed alarms and LED related to remote manual emergency stop

3) OPEN CIRCUIT MONITOR FUNCTION

The cable open monitor check and see cables related shut-down and important signal cable. The operator can check and see important cable by observing the LED on the safety unit.

4) ALARM BLOCKING FUNCTION

During the engine is standstill, L.O Press is condition of low press. In this case, the safety system is shut-down condition of automatic stop. So, to prevent unnecessary engine shutdown condition at the time of engine standstill, the safety system uses the function of Alarm Blocking.

The safety system is also ready to generate alarm Blocking signal to be sent to alarm system on the yard.

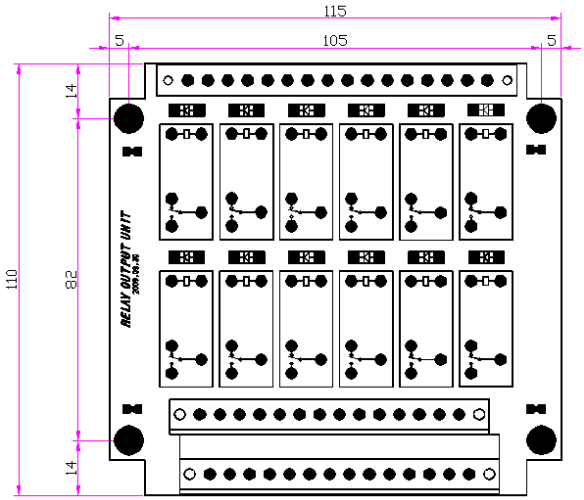


FIGURE12. ROU

< Relay out unit(ROU) FIGURE 12>

1. Description:

This relay unit is operated by the safety control unit.

This unit is composed of 12EA G2R-1 relays(24VDC) and it drives as follows :

- Shutdown(To msbd)
- Engine run(To msbd)
- Alarm blocking(To ams)
- Prelubrication oil pump on signal(To prelub. oil pump starter)
- Jacket water preheater on signal(To JW preheater starter)
- Governor source fail
- Emergency stop solenoid valve
- Start fuel limitation solenoid valve

PART 1. GENERAL

PART 2. FUNCTION EXPLANATION

PART 3. TROUBLE SHOOTING

PART 4. SETTING

KOMECO

ENG. TYPE	FUNCTION EXPLANATION(ADU/MCU/SMU)	PART2
Standard		1/5

Analog / Digital unit(ADU-36-TCP)

Function	Explanation
ARROW UPWARD	When channel increases or setting value increases, please, use ARROW UPWARD.
ARROW DOWNWARD	When channel decreases or setting value decreases, please, use ARROW DOWNWARD .
ENT	When setting mode selects or setting value stores, please, use ENT.
DEV.ALARM (Deviation alarm)	When difference of above the set value is occurs between cylinders, “DEV. ALARM” LED Turns on.
SENSOR OPEN (Current / PT100)	When Pressure or Temperature sensor is left out or when signal which is not connected doesn’t input, “Current / PT100 OPEN”LED turns on.
SELF TEST	SELF TEST indicates normal operation of unit , if unit operates normally, “SELF TEST” LED turns on, at regular intervals.
SETTING MODE	When unit enters with setting mode, “SETTING MODE” LED turns on.
SPARE	SPARE indicates channel which dosen’t use.

Main Control Unit(MCU-56-DIO)

Function	Explanation
ARROW UPWARD	When channel increases or setting value increases, please use ARROW UPWARD .
ARROW DOWNWARD	When channel decreases or setting value decreases, please, use ARROW DOWNWARD.
ENT	When setting mode selects or setting value stores, please use ENT.
SELF TEST	SELF TEST indicates normal operation of unit , if unit operates normally, “SELF TEST” LED turns on, at regular intervals.
RS485/422 COMM.	If MODBUS communication is carried out normally, “RS485/422 COMM. “LED turns on.
CAN ERROR	If the problem occurs CAN communication between ADU and MCU and SMU, “CAN Error” LED turns on.

Speed Control Unit(SMU-08-SC)

Function	Explanation
ARROW UPWARD	When channel increases or setting value increases, please, use ARROW UPWARD.
ARROW DOWNWARD	When channel decreases or setting value decreases, please, use ARROW DOWNWARD.
ENT	When setting mode selects or setting value stores, please, use ENT.
SELF TEST	SELF TEST indicates normal operation of unit , if unit operates normally, “SELF TEST” LED turns on, at regular intervals.
TACHO FAIL.	When Pick-up sensor is left out, or when Pick-up sensor dosen’t work, “TACHO FAIL” LED turns on.
SAFETY START	When Engine is safe stop condition, “SAFETY START” LED turns on. (0RPM + 5sec)
SETTING MODE	When unit enters with setting mode, “SETTING MODE” LED turns on.
ENGINE RUN	When engine is running condition, “ENGINE RUN” LED turns on.
OVERSPEED	When engine is overspeed condition, “OVERSPEED” LED turns on.

KOMECO

ENG. TYPE	FUNCTION EXPLANATION(OPU/ETM/MTP)	PART2
Standard		2/5

Operating Unit(OPU-10)

Function	Explanation
START BUTTON	The Engine is made start by START BUTTON.(when it is local mode)
STOP BUTTON	The Engine is made stop by STOP BUTTON. (for 3 seconds presses, when it is local mode)
REMOTE BUTTON	The Engine is converted Remote mode by REMOTE BUTTON.
LOCAL BUTTON	The Engine is converted Local mode by LOCAL BUTTON.
BLOCKING RESET BUTTON	BLOCKINGRESET BUTTON closes an engine in Remote mode, Local mode for safe working, when Engine repairs or alarm cancels.
LAMP TEST BUTTON	LAMP TEST BUTTON confirms normal condition of indication LED.
OVERSPEED TRIP	When engine is overspeed condition, "OVERSPEED TRIP" LED turns on.
L.O LOW PRESS. TRIP	When pressure of L.O is lower than normal, "L.O LOW PRESS. TRIP" LED turns on.
H.T WATER HIGH TEMP. TRIP	When temperature of H.T WATER is higher than normal, "H.T WATER HIGH TEMP.TRIP"LED turns on.
BOTH TACHO FAIL TRIP	When it detects "TACHO FAIL" in SMU unit and Safety unit, at once , "BOTH TACHO FAIL TRIP" LED turns on.
EM'CY STOP	If Engine makes emergency stop, "EM'CY STOP" LED turns on.
SPARE	SPARE indicates channel which doesn't use.
READY TO START	If it has a condition for Engine working, "READY TO START"LED turns on.

Exhaust Gas Temperature Monitor(ETM-12CA)

Function	Explanation
TC INLET A,B,C	TC INLET A,B,C confirms the entered gas temperature to Turbo charger.
TC OUTLET	TC OUTLET confirms the exhausted gas temperature from Turbo charger.
CYLINDER 1~9	CYLINDER 1~9 confirms the exhausted waste gas temperature within Cylinder 1~6.
ARROW UPWARD	ARROW UPWARD confirms normal condition of LED by pressing ARROW UPWARD and ARROW DOWNWARD, at once or confirm channel sequentially from upper.
ARROW DOWNWARD	ARROW DOWNWARD confirms normal condition of LED by pressing ARROW UPWARD and ARROW DOWNWARD, at once or confirm channel sequentially from lower.
AUTO SCAN	AUTO SCAN scans from left, sequentially without control of ARROW UPWARD / DOWNWARD

KOMECO

ENG. TYPE	FUNCTION EXPLANATION(OPU/ETM/MTP)	PART2
Standard		3/5

Temperature & Pressure Monitor(MTP-12CA)

Function	Explanation
HT WATER TEMP. ENGINE INLET	HT WATER TEMP. ENGINE INLET confirms the entered temperature of HT WATER to Engine.
HT WATER TEMP. ENGINE OUTLET	HT WATER TEMP. ENGINE OUTLET confirms the exhausted temperature of HT WATER from Engine.
HT WATER PRESS. ENGINE INLET	HT WATER PRESS. ENGINE INLET confirms the entered pressure of HT WATER to Engine
LT WATER TEMP. AIR COOLER INLET	LT WATER TEMP. AIR COOLER INLET confirms the entered temperature of LT WATER to Air cooler.
LT WATER TEMP. AIR COOLER OUTLET	LT WATER TEMP. AIR COOLER OUTLET confirms the exhausted temperature of LT WATER from Air cooler.
LT WATER PRESS. ENGINE INLET	LT WATER PRESS. ENGINE INLET confirms the entered pressure of LT WATER to Engine.
CHARGE AIR TEMP. AIR COOLER OUTLET	CHARGE AIR TEMP. AIR COOLER OUTLET confirms the exhausted temperature of CHARGE AIR from Air cooler.
CHARGE AIR PRESS. AIR COOLER OUTLET	CHARGE AIR PRESS. AIR COOLER OUTLET confirms the exhausted pressure of CHARGE AIR from Air cooler.
LUB. OIL TEMP. ENGINE INLET	LUB. OIL TEMP. ENGINE INLET confirms the entered temperature of L.O to Engine.
LUB. OIL PRESS. FILTER INLET	LUB. OIL PRESS. FILTER INLET confirms the entered pressure of L.O to filter
LUB. OIL PRESS. TC INLET	LUB. OIL PRESS. FILTER INLET confirms the entered pressure of L.O to Turbo charger.
FUEL OIL TEMP. ENGINE INLET	FUEL OIL TEMP. ENGINE INLET confirms the entered temperature of F.O to Engine..
FUEL OIL PRESS. ENGINE INLET	FUEL OIL PRESS. ENGINE INLET confirms the entered pressure of F.O to Engine..
FUEL OIL PRESS. FILTER INLET	FUEL OIL PRESS. FILTER INLET confirms the entered pressure of F.O to Filter.
COMP. AIR PRESS. ENGINE INLET	COMP. AIR PRESS. ENGINE INLET confirms the entered pressure of COMP. AIR from Engine..
ARROW UPWARD	ARROW UPWARD confirms normal condition of LED by pressing ARROW UPWARD and ARROW DOWNWARD, at once or confirm channel sequentially from upper.
ARROW DOWNWARD	ARROW DOWNWARD confirms normal condition of LED by pressing ARROW UPWARD and ARROW DOWNWARD, at once or confirm channel sequentially from lower.
AUTO SCAN	AUTO SCAN scans from left, sequentially without control of ARROW UPWARD / DOWNWARD.

KOMECO

ENG. TYPE	FUNCTION EXPLANATION(SCCS)	PART2
Standard		4/5

Safety Control Unit(SCCS-4-8)

Function	Explanation
OVERSPEED	When engine is overspeed condition, “OVERSPEED TRIP” LED turns on.
RUNNING	When engine is running condition, “RUNNING” LED turns on.
SAFETY	When Engine is safe stop condition, “SAFETY” LED turns on.
TACHO. FAIL	When Pick-up sensor is left out, or when Pick-up sensor dosen’t work “TACHO FAIL” LED turns on.
ALARM BLOCKING	When engine dosen’t occur useless output in stop condition, “ALARM BLOCKING” LED turns on.
COMMON SHUTDOWN	If it occurs at least 1 shutdown, “COMMON SHUTDOWN”LED turns on.
POWER & SYS. FAIL	If OMD detector a problem, “POWER & SYS. FAIL” LED turns on.
SELF TEST	SELF TEST indicates normal operation of unit , if unit operates normally, “SELF TEST” LED turns on, at regular intervals.
L.O LOW PRESS.	When pressure of LO is lower than normal, “L.O LOW PRESS. TRIP” LED turns on.
H.T WATER HIGH	When temperature of H.T WATER is higher than normal, “H.T WATER HIGH TEMP.TRIP”LED turns on.
BUTTON EM’CY	If you push the emergency stop button on Starting box panel, “BUTTON EM’CY” turns on.
REMOTE EM’CY	If you push the emergency stop button on Remote, “REMOTE EM’CY” LED turns on.
EM’CY SOL V/V	If Engine is stopped by Button em’cy or Remote em’cy, “EM’CY SOL V/V” is output and LED turns on.
CABLE #1~#7	CABLE #1~#7 confirms connection of sensor cable related to shutdown. if it isn’t connected, LED turns off.
LAMP TEST BUTTON	LAMP TEST BUTTON confirms normal condition of indication LED.
TEST BUTTON	TEST BUTTON confirms normal condition of Cable supervision.

KOMECO

ENG. TYPE	FUNCTION EXPLANATION(SCCS)	PART2
Standard		5/5

Main Terminal Board(M-TB) 

INPUT	설명
REMOTE START	Engine start signal is inputted when engine start in remote mode.
REMOTE STOP	Engine stop signal is inputted when engine stop in remote mode.
START INTER LOCK	Start interlock signal is inputted from M.S.B.D, Close contact is inputted when the start interlock Is ON.

OUTPUT	설명
START FAIL (N.O)	Contact is closed when the start fail alarm occurred.
ENGINE NORMAL STOP (N.O)	Contact is closed when the engine is stop normally. And contact is opened when the engine RPM is 0 RPM.
ENGINE STOP (N.O)	Contact is closed when the engine is stop. (NORMAL STOP, SHUTDOWN)
READY TO START (N.O)	Contact is closed when the ready to start condition is satisfied.
REMOTE (N.O)	Contact is closed when the remote mode is set.
CONTROL SOURCE FAIL (N.C)	Contact is opened when the control source power is failed.

KOMECO

ENG. TYPE	FUNCTION EXPLANATION(SCCS)	PART2
Standard		5/5

Relay Output Unit(ROU) 

INPUT	설명
EM'CY STOP	Emergency stop signal is inputted from emergency stop button.

OUTPUT	설명
START/ STOP PRELUB. OIL PUMP	Pump is start on when the engine RPM is below than 200 RPM. And stop when the engine is running.
START/ STOP PREHEATER	Heater is start on when the engine RPM is below than 200 RPM. And stop when the engine is running.
COMMON SHUTDOWN (N.O)	Contact is closed when the engine is shutdown.
ENGINE RUN (N.O)	Contact is closed when the engine is running.
ALARM BLOCKING (N.O)	Contact is closed when the blocking mode is set by the engine run off.
OVER 25% RPM	Contact is closed after 1sec when the engine RPM is reach 25% of rate RPM. And opened when the engine RPM is below than 23% of rate RPM.

PART 1. GENERAL

PART 2. FUNCTION EXPLANATION

PART 3. TROUBLE SHOOTING

Page 1/14 : General

Page 2/14 ~ 7/14 : Safety system.

Page 8/14 ~ 14/14 : Control & Monitoring system

PART 4. SETTING

KOMECO

ENG. TYPE	TROUBLE SHOOTING	PART3
Standard		1/14

Trouble Shooting

This description is a trouble shooting guide for the automation system on the diesel engine type H17/28,H21/32,H25/33,H32/40.

General

The following trouble shooting guide is and aid in isolating troubles to the engine built-on safety system and monitoring system incl.

The sensors connected to these system.

CAUTION!

The control system is working on DC24V power. Don't be supply power except DC24V.

The control system can be damaged with AC power or overvoltage.

When replacing a control unit, check that the power supply is switched off during replacement and check the power supply for the correct voltage before switching-on.

If the conclusion of a trouble shooting indicates that an exchange of a module is needed, return the module together with the inspection report to the engine maker.

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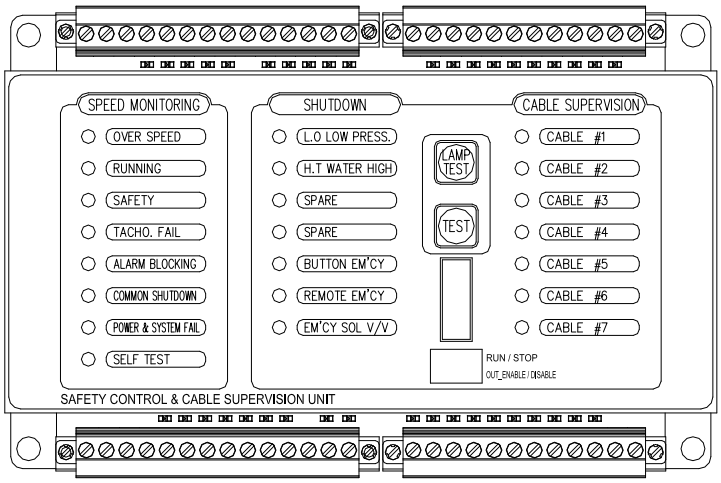
ENG. TYPE	TROUBLE SHOOTING	PART3
Standard		2/14

Safety system

The safety system is an independent system and Fig 1. show a safety module and relay output module. Front LED show a sensor signal and an self-operating conditions.

Lamp test and cable supervision test button is prepared for function test. Lamp test button is used for front lamp test. Test button is used to identify a cable supervision function. When sensor line is connected correctly, all LED of cable supervision are lighted. after 2sec when test button is pushed continuously, safety cable failure alarm is activated and turn off all LEDs.

The reference number for each input and output can be found in the scheme.



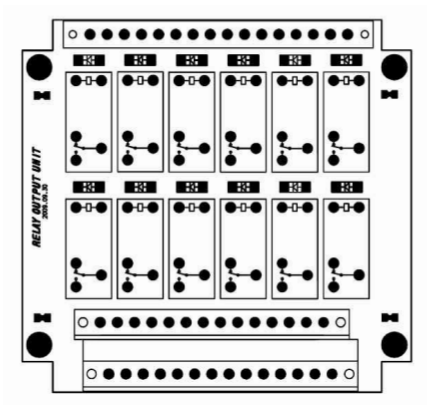


Fig 1 Safety system

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ENG. TYPE	TROUBLE SHOOTING(Safety system)	PART3
Standard		3/14

Table 1.

Trouble	Possible cause	Trouble shooting	Remark
Cable supervision			
"L.O LOW PRESS." Cable supervision LED turned OFF	Cable check ① Wrong connection of the Cable. ② A 100kΩ resistor for cable supervision is not installed. ③ Cable wire broken. ④ Internal component defect by internal / external factors	① Check the "X4-4,5,6"terminals for cable wiring in the terminal box. ② Measure the end wire of Shutdown Sensor to identify resistor value 100kΩ and install. ③ Exchange the cable wire, if it broken. ④ Replace the SCCS-4-8 module.	-
"H.T WATER HIGH" Cable supervision LED turned OFF	Cable check ① Wrong connection of the Cable. ② A 100kΩ resistor for cable supervision is not installed. ③ Cable wire broken. ④ Internal component defect. by internal / external factors	① Check the "X4-7,8,9"terminals for cable wiring in the terminal box. ② Measure the end wire of Shutdown Sensor to identify resistor value 100kΩ and install. ③ Exchange the cable wire, if it broken. ④ Replace the SCCS-4-8 module.	-
"OIL MIST HIGH DENSITY" Cable supervision LED turned OFF	Cable check ① Wrong connection of the Cable. ② A 100kΩ resistor for cable supervision is not installed. ③ Cable wire broken. ④ Internal component defect. by internal / external factors	① Check the "X4-16,17,18"terminals for cable wiring in the terminal box. ② Measure the end wire of Shutdown Sensor to identify resistor value 100kΩ and install. ③ Exchange the cable wire, if it broken. ④ Replace the SCCS-4-8 module.	-
"BUTTON EM'CY" Cable supervision LED turned OFF	Cable check ① Wrong connection of the Cable. ② A 100kΩ resistor for cable supervision is not installed. ③ Cable wire broken. ④ Internal component defect. by internal / external factors	① Check the "X2-21,22"terminals for cable wiring in the terminal box. ② Measure the end wire of Shutdown Sensor to identify resistor value 100kΩ and install. ③ Exchange the cable wire, if it broken. ④ Replace the SCCS-4-8 module.	-
"REMOTE EM'CY" Cable supervision LED turned OFF	Cable check ① Wrong connection of the Cable. ② A 100kΩ resistor for cable supervision is not installed. ③ Cable wire broken. ④ Internal component defect. by internal / external factors	① Check the "X4-29,30"terminals for cable wiring in the terminal box. ② Measure the end wire of Shutdown Sensor to identify resistor value 100kΩ and install. ③ Exchange the cable wire, if it broken. ④ Replace the SCCS-4-8 module.	-
"EM'CY SOL. V/V" Cable supervision LED turned OFF	Cable check ① Wrong connection of the Cable. ② A 100kΩ resistor for cable supervision is not installed. ③ Cable wire broken. ④ Internal component defect by internal / external factors	① Check the "X4-12,13"terminals for cable wiring in the terminal box. ② Measure the end wire of Shutdown Sensor to identify resistor value 100kΩ and install. ③ Exchange the cable wire, if it broken. ④ Replace the SCCS-4-8 module.	-
Lamp test failure	When push the "LAMP TEST" button, all of the LEDs are turned on. If LEDs are not turned on, replace the SCCS-4-8 module.		-
"Safe cable failure" signal out.	① Sensor cable disconnection. ② Internal component defect by internal / external factors	① Check the connection correctly and all of the cable supervision LEDs are turned on. ② Replace the SCCS-4-8 module..	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING(Safety system)	PART3
Standard		4/14

Table 1.

Trouble	Possible cause	Trouble shooting	Remark
Status monitoring			
"OVERSPEED"signal output. (Eng. stop condition)	① Pick-up sensor failure. ② Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Replace the SCCS-4-8 module.	-
"OVERSPEED"signal not output. (Eng. overspeed condition)	① Pick-up sensor failure. ② Pick-up sensor wire wrong connection. ③ Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Check the 33erminals as follows for the cable wiring in the terminal box. X4-1 = + input X4-2 = Signal input X4-3 = - input ③ Replace the SCCS-4-8 module.	-
"RUNNING"signal output. (Eng. stop condition)	① Pick-up sensor failure. ② Internal component defect by internal / external factors.	① Exchange the pick-up sensor, if it is malfunction. ② Replace the SCCS-4-8 module.	-
"RUNNING"signal not output. (Eng. run condition)	① Pick-up sensor failure. ② Pick-up sensor open. ③ Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Check the 33erminals as follows for the cable wiring in the terminal box. X4-1 = + input X4-2 = Signal input X4-3 = - input ③ Replace the SCCS-4-8 module.	-
"SAFETY" signal not output. (Eng. stop condition)	① Pick-up sensor failure. ② Not "L.O press. shutdown" state. ③ Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Check the "X4-4,5,6"terminals for cable wiring in the terminal box. (5-6 close at Eng. stop condition) ③ Replace the SCCS-4-8 module.	-
"SAFETY" signal output. (Eng. run condition)	① Pick-up sensor failure. ② Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Replace the SCCS-4-8 module.	-
"TACHO FAIL"output	① Pick-up sensor failure. ② Pick-up sensor open. ③ Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Check the 33erminals as follows for the cable wiring in the terminal box. X4-1 = + input X4-2 = Signal input X4-3 = - input ③ Replace the SCCS-4-8 module.	-
"ALARM BLOCKING" signal output. (Eng. run condition)	① Pick-up sensor wire open. ② Internal component defect by internal / external factors	① Check the pick-up sensor wire connection correctly ② Replace the SCCS-4-8 module.	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING(Safety system)	PART3
Standard		5/14

Table 1.

Trouble	Possible cause	Trouble shooting	Remark
"ALARM BLOCKING" signal not output. (Eng. stop condition)	① Pick-up sensor is malfunction by noise or the other factors. ② Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Replace the SCCS-4-8 module.	-
"common shutdown" signal not output. (Eng. shutdown condition)	① Shutdown signal wire wrong connection. ② Internal component defect by internal / external factors	① Check the "X2-7,8" terminals in the terminal box and common shutdown LED on the SCCS-4-8 module. (It is close state at shutdown) ② Replace the SCCS-4-8 module.	-
"common shutdown" signal output.	① Shutdown signal input. ② Internal component defect by internal / external factors	① Check the "X2-7,8" terminals in the terminal box and common shutdown LED on the SCCS-4-8 module. (It is open state at normal) ② Replace the SCCS-4-8 module.	-
"Power & system fail"signal output.	① "O.M.D SYSTEM FAIL" Signal input. ② Internal component defect by internal / external factors	① Check the "X4-19,20" terminals in the terminal box. (It is close state at normal) ② Replace the SCCS-4-8 module.	-
"Self test" LED not flickering.	① Internal component defect by internal / external factors	① Replace the SCCS-4-8 module.	-
Cable supervision LED is not turned off. (When push the "test" button)	① Internal component defect by internal / external factors	① Replace the SCCS-4-8 module.	-
Shutdown			
"L.O LOW PRESS" LED Turned on. (Eng. run condition)	① "L.O LOW PRESS"Shutdownsignal input. ② Internal component defect by internal / external factors	* If the "Common shutdown" output, ① Check the "X4-4,5,6" terminals in the terminal box.(5-6 Normal close) * If the "Common shutdown" not output, ② Replace the SCCS-4-8 module.	-
"H.T WATER HIGH" LED Turned on. (Eng. run condition)	① "H.T WATER HIGH" Shutdown signal input. ② Internal component defect by internal / external factors	* If the "Common shutdown" output, ① Check the "X4-7,8,9" terminals in the terminal box.(7-8 Normal close) * If "Common shutdown" not output, ② Replace the SCCS-4-8 module.	-
"OIL MIST HIGH…" LED Turned on. (Eng. run condition)	① "OIL MIST HIGH…" Shutdown signal input. ② Internal component defect by internal / external factors	* If the"Common shutdown" output, ① Check the "X4-16,17,18" terminals in the terminal box. (16-17 Normal close) * If the"Common shutdown" not output, ② Replace the SCCS-4-8 module.	-
"BUTTON EM'CY" LED Turned on.	① "BUTTON EM'CY"Shutdown signal input. ② Internal component defect by internal / external factors	① Check the "X2-21,22" terminals in the terminal box. (21-22 Normal open) ① Common shutdown output check. ② Replace the SCCS-4-8 module. if the "Common shutdown" is not output.	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING(Safety system)	PART3
Standard		6/14

Table 1.

Trouble	Possible cause	Trouble shooting	Remark
"REMOTE EM'CY" LED Turned on.	① "REMOTE EM'CY" Shutdown signal input. ② Internal component defect by internal / external factors	① Check the "X2-29,30" terminals in the terminal box. (29-30 Normal open) ① Check the "COMMON SHUTDOWN" output. ② Replace the SCCS-4-8 module, if the "Common shutdown" is not output.	-
"EM'CY SOL. V/V" LED Turned on.	① Shutdown signal input. ② Internal component defect by internal / external factors	* If the "Common shutdown" output, ① Shutdown signal input check * If the"Common shutdown" not output, ② Replace the SCCS-4-8 module.	-
The others			
"Priming L.O pump on" signal on. (Eng. run condition)	① Pick-up sensor failure. ② Pick-up sensor open. ③ Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Check the 35erminals as follows for the cable wiring in the terminal box. X4-1 = + input X4-2 = Signal input X4-3 = - input ② Check the "X2-3,4" terminals in the terminal box. (3-4 open contact, if Eng. run state) ③ Replace the SCCS-4-8 module.	-
"Jacket-water pre-heater on" signal on. (Eng. run condition)	① Pick-up sensor failure. ② Pick-up sensor open. ③ Internal component defect by internal / external factors	① Exchange the pick-up sensor, if it is malfunction. ② Check the 35erminals as follows for the cable wiring in the terminal box. X4-1 = + input X4-2 = Signal input X4-3 = - input ② Check the "X2-5,6" terminals in the terminal box. (5-6 open contact, if Eng. run state) ③ Replace the SCCS-4-8 module.	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING(Safety system)	PART3
Standard		7/14

Table 1.(Bearting Temp. Module)

Trouble	Possible cause	Trouble shooting	Remark
"PT. OPEN" LED Turned on.	① Wrong connection or broken of the temp. sensor wire ② Sensor wire disconnection. ③ Sensor failure. ④ Internal component defect by internal / external factors	① Check the wrong connection or broken, for the temp. sensor wire. ② Check the TB3, TB4 terminal connection for the temp. sensor on the bearing temp. monitor module. ③ Exchange the temp.sensor, if it is malfunction. ④ Replace the BTM module.	-
"SETTING MODE" LED not turned on. (When enter the setting mode)	① Can not push the up/down/ent key. ② Internal component defect by internal / external factors.	① Lamp test operation. (UP key + DOWN key pushing at the same time) ② Replace the BTM module.	-
"CAN ERROR"LED turned on.	① Wrong connection of the CAN wire. ② CAN wire is broken. ③ Terminal block connection faulty. ④ Internal component defect by internal / external factors	① Check the "TB10", "X5" terminal connection correctly as follows, TB2(No.1,2) ② Exchange the CAN wire, if it is broken. ③ Check the terminal connection properly. ④ Replace the BTM module.	-
"SELF TEST" LED not flickering. (In normal condition, LED is flickering)	① Entering the "SETTING MODE" ② Internal component defect by internal / external factors	① Check that it is "SETTING MODE". (In setting mode, "SELF TEST" LED is not flickering) ② Replace the BTM module.	-
"Bearing high temp. shutdown" signal not output at shut-down state	① Temp. sensor malfunction. ② Internal component defect by internal / external factors	① Check the temp. value all channel. ② Replace the BTM module.	-
"Main bearing high temp. trip" LED not turned off at normal state.	① Control mode not "Block / Reset" position. ② Engine running state. ③ Bearing temp. is not normal value. ④ Internal component defect by internal / external factors	① Check the control mode at the operating unit. ② Check the "safety state" LED turned on at the SMU-08-SC unit. ③ Check the bearing temp. all channel. ④ Replace the BTM module.	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING	PART3
Standard	(Control & Monitoring system)	8/14

Control & Monitoring system

The monitoring system monitors shows all relevant pressure, temperature, RPM on the engine.

The monitoring system consists of six hard-ware modules and Fig 2 describes the hardware.

All analog sensor are connected to the analog-digital unit(ADU-36-TCP) through main terminal board (M-TB). The engine pick-up and turbo-charger pick-up are connected to the speed measuring unit(SMU-08-SC) through M-TB.

The others sensor are connected to main control unit(MCU-56-DIO) through M-TB.

The all units are connected via interlink CAN bus except M-TB.

When the interlink CAN error is activated, a monitors display “CAN Error" on FND at the Operating unit(OPU-10), Temp. and pressure Module(MTP-12CA),Exh.gas temp. monitor(ETM-12CA)

Interface to the alarm and monitoring system in the control room is made by MODBUS and at normal condition, RS485/422 COMM. LED is flickering on the MCU unit.

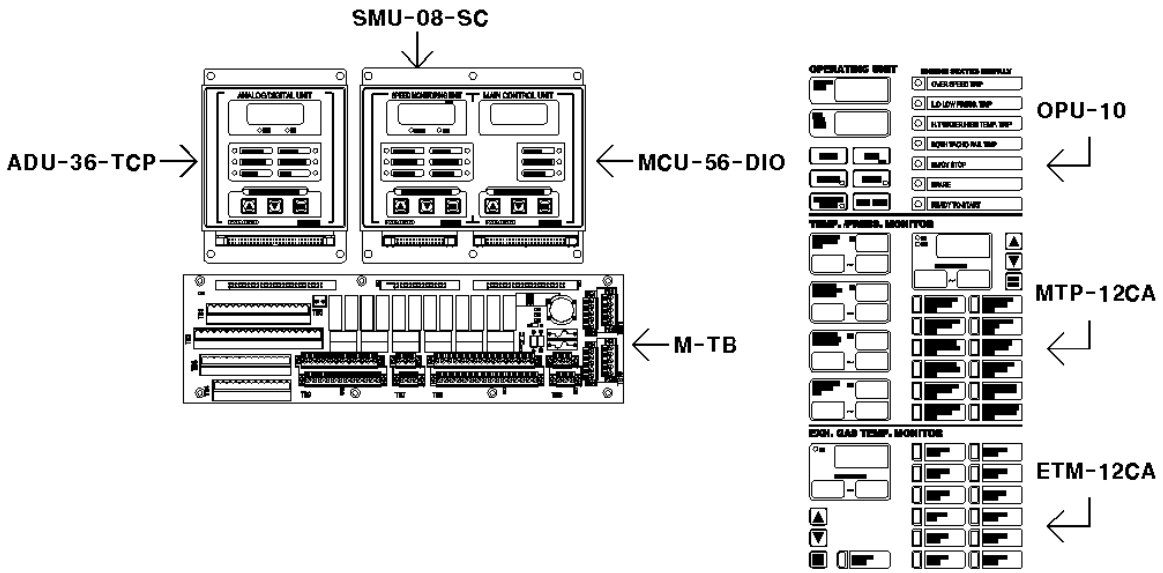


FIG2. Control & Monitoring system

KOMECO

ENG. TYPE	TROUBLE SHOOTING	PART3
Standard	(Control & Monitoring system)	9/14

Table 2.

Trouble	Possible cause	Trouble shooting	Remark
About ADU-36-TCP unit,			
"DEVIATION ALARM" LED turned on.	① Temp. of cylinder exceed the reference value. ② Wrong connection or broken of the temp. sensor wire. ③ Sensor wire disconnection. ④ Sensor failure. ⑤ Internal component defect by internal / external factors	① Check the cylinder temperature and Check that if there are temperature deviation. ② Check the wrong connection or broken, for the temp. sensor wire. ③ Check the TB3,4(No.29~50D) terminal connection for the temp. sensor on the main terminal board. ④ Exchange the temp.sensor, if it is malfunction. ⑤ Replace the ADU-36-TCP module.	-
"CURRENT OPEN" LED turned on.	① Wrong connection or broken of the press. sensor wire ② Sensor wire disconnection. ③ Sensor failure. ④ Internal component defect by internal / external factors	① Check the wrong connection or broken, for the press. sensor wire. ② Check the TB2(No.80~97A) terminal connection for the temp. sensor on the main terminal board. ③ Exchange the press.sensor, if it is malfunction. ④ Replace the ADU-36-TCP module.	-
"PT.OPEN" LED turned on.	① Wrong connection or broken of the temp. sensor wire ② Sensor wire disconnection. ③ Sensor failure. ④ Internal component defect by internal / external factors	① Check the wrong connection or broken, for the temp. sensor wire. ② Check the TB1(No.51~66) terminal connection for the temp. sensor on the main terminal board. ③ Exchange the temp.sensor, if it is malfunction. ④ Replace the ADU-36-TCP module.	-
"SETTING MODE" LED not turned on. (When enter the setting mode)	① Can not push the up/down/ent key. ② Internal component defect by internal / external factors.	① Lamp test operation. (UP key + DOWN key pushing at the same time) ② Replace the ADU-36-TCP module.	-
"SELF TEST" LED not flickering. (In normal condition, LED is flickering)	① Entering the "SETTING MODE" ② Internal component defect by internal / external factors	① Check that it is "SETTING MODE". (In setting mode, "SELF TEST" LED is not flickering) ② Replace the ADU-36-TCP module.	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING	PART3
Standard	(Control & Monitoring system)	10/14

Table 2.

Trouble	Possible cause	Trouble shooting	Remark
UP/DOWN/ENT key is not working properly	① System failure. ② Internal component defect by internal / external factors	① Check the "SELF TEST"LED is flickering. ② Replace the ADU-36-TCP module.	-
About SMU-08-SC			
"TACHO FAIL" LED turned on.	① Pick-up sensor open. ② Wrong connection of the pick-up wire ③ Pick-up sensor failure. ④ Internal component defect by internal / external factors.	① Check the TB7(No.125~127) ter--minal for the pick-up sensor on the Main terminal board . ② Check the sensor connection as follows. No.125 = + input. No.126 = Signal input. No.127 = - input. ③ If the engine is running state, pick-up sensor malfunction. ④ Replace the SMU-08-SC module.	-.
"SAFETY START" LED not turned on.	① Pick-up sensor open. ② Wrong connection of the pick-up wire ③ Internal component defect by internal / external factors.	① Check the TB7(No.125~127) ter--minal for the pick-up sensor on the Main terminal board . ② Check the sensor connection as follows. No.125 = + input. No.126 = Signal input. No.127 = - input. ③ Replace the SMU-08-SC module.	
"ENGINE RUN" signal not output (Eng. run condition)	① Pick-up sensor open. ② Engine model mismatched. ③ Pick-up sensor failure.. ④ Internal component defect by internal / external factors.	① Check the TB7(No.125~127) ter--minal for the pick-up sensor on the Main terminal board . ① Check the sensor connection as follows. No.125 = + input. No.126 = Signal input. No.127 = - input. ① Check that RPM is displayed on the SMU module's FND. ② Check the engine model refer to setting manual. ③ Exchange the pick-up sensor ④ Replace the SMU-08-SC module.	-
"SELF TEST" LED not flickering. (In normal condition LED is flickering)	① Entering the "SETTING MODE". ② System failure. ③ Internal component defect by internal / external factors	① Check that it is "SETTING MODE". (In setting mode, "SELF TEST" LED is not flickering) ② Replace the SMU-08-SC module.	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING	PART3
Standard	(Control & Monitoring system)	11/14

Table 2.

Trouble	Possible cause	Trouble shooting	Remark
"SETTING MODE" LED not turned on. (When enter the setting mode)	① Can not enter the "SETTING MODE" ② Internal component defect by internal / external factors	①,② Refer to PART4. Setting manual , and if entered "setting mode" properly, then internal component defect.(Replace the module)	-
UP/DOWN/ENT key is not working properly	① System failure. ② Internal component defect by internal / external factors.	① Check the "SELF TEST"LED is flickering. ② Replace the SMU-08-SC module.	-
Not display RPM on FND	① Wrong connection of the pick-up wire ② Internal component defect by internal / external factors.	① Check the TB7(No.125~127) ter-minal for the pick-up sensor on the Main terminal board . ① Check the sensor connection as follows. No.125 = + input. No.126 = Signal input. No.127 = - input. ② Replace the SMU-08-SC module.	-
About MCU-56-DIO			
"SELF TEST"LED not flickering. (In normal condition LED is flickering)	① Entering the "SETTING MODE". ② System failure. ③ Internal component defect by internal / external factors	① Check that it is "SETTING MODE". (In setting mode, "SELF TEST" LED is not flickering) ② Replace the MCU-56-DIO module.	-
"RS485/422 COMM." LED not flickering.	① Wrong connection of the communi-cation wire. ② Communication setting is improper. ③ RS485/422 select switch is wrong direction what i used for. ④ Communication wire broken. ⑤ Not installed terminating resistance. ⑥ Internal component defect by internal / external factors	① Check the "TB8,TB11" terminals on the Main terminal board and "X3" erminal in the Terminal box. Check the wiring connection as follows. RS485 : TB8(No.76~81) X3(No.1~6) RS422 : TB11(No.139~148) X3(No.7~16) ② Check the communication mode & address at the lately set up. ③ Check the RS485/422 select switch top of the MCU/SMU module. ④ Check the CAN wiring broken. ⑤ Install the terminating resistance at the "TB8,TB11" terminals or "X3" terminal, if it is not installed. ⑥ Replace the MCU-56-DIO module.	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING	PART3
Standard	(Control & Monitoring system)	12/14

Table 2.

Trouble	Possible cause	Trouble shooting	Remark
"CAN ERROR"LED turned on.	① Wrong connection of the CAN wire. ② CAN wire is broken. ③ Terminal block connection faulty. ④ Internal component defect by internal / external factors	① Check the "TB10", "X5" terminal connection correctly as follows, TB10(No.128,129,134) X5 (No.3,4,5) ② Exchange the CAN wire, if it is broken. ③ Check the terminal connection properly. ④ Replace the MCU-56-DIO module.	-
About OPU-10 / ETM-12CA / MTP-12CA			
"READY TO START" LED not turned on.	① Not Eng. stop condition. ② Turning bar engage. ③ L.O Press. T/C inlet < 0.1bar ④ Engine control mode is "Blocking reset". ⑤ Both tacho fail state.	① Check the engine is stop condition. ② Check the turning bar disengaged. ③ L.O Press. T/C inlet > 0.1bar ④ Change the engine control mode. ("REMOTE" or "LOCAL") ⑤ Check the connection correctly for the pick-up wire.	-
"START SOL. V/V" signal not output. (When push the start button)	① Control mode is "BLOCKING RESET" ② Not "READY TO START" condition. ③ Not "START FAIL" reset. ④ CAN Error.	① Change the engine control mode. ("REMOTE" or "LOCAL") ② Make "READY TO START"condition ③ Wait for until "START FAIL" reset. ④ Check the "CAN Error" displayed, in front of OPU module.	-
"CAN ERROR" display on FND in front of OPU unit.	① Wrong connection of the CAN wire. ② CAN wire broken. ③ Terminal block connection faulty. ④ Internal component defect by internal / external factors ⑤ MCU-56-DIO unit fault.	① Check the "X5-3,4" terminals for the CAN wire as follows. *Terminal box X5-3 = CANH* *X5-4 = CANL* *X5-5 = SHIELD* *OPU-12CA TB1-4 = CANH* *TB1-5 = CANL* *TB1-6 = SHIELD* ② Check the CAN wire broken. And then Exchange the CAN wire, if it is broken. ③ Check the terminal connection properly. ④ Replace the OPU-10 module. ⑤ Check that the "SELF TEST" LED is flickering and "CAN Error"LED is turned on.	-

KOMECO

ENG. TYPE	TROUBLE SHOOTING	PART3
Standard	(Control & Monitoring system)	13/14

Table 2.

Trouble	Possible cause	Trouble shooting	Remark
"CAN ERROR" display on FND in front of ETM unit.	① Wrong connection of the CAN wire. ② CAN wire broken. ③ Terminal block connection faulty. ④ Internal component defect by internal / external factors ⑤ ADU-36-TCP unit fault.	① Check the "X5-3,4" terminals for the CAN wire as follows. *Terminal box X5-3 = CANH* *X5-4 = CANL* *X5-5 = SHIELD* *ETM-12CA TB1-4 = CANH* *TB1-5 = CANL* *TB1-6 = SHIELD* ② Check the CAN wire broken. And then Exchange the CAN wire, if it is broken. ③ Check the terminal connection faulty or properly. ④ Replace the ETM-12CA module. ⑤ Check that the "SELF TEST" LED is flickering and normal analog value is displayed for each channel on the FND.	-
"CAN ERROR" display on FND in front of MTP unit.	① Wrong connection of the CAN wire. ② CAN wire broken. ③ Terminal block connection faulty. ④ Internal component defect by internal / external factors ⑤ ADU-36-TCP unit fault.	① Check the "X5-3,4" terminals for the CAN wire as follows. *Terminal box X5-3 = CANH* *X5-4 = CANL* *X5-5 = SHIELD* *MTP-12CA TB1-4 = CANH* *TB1-5 = CANL* *TB1-6 = SHIELD* ② Check the CAN wire broken. And then Exchange the CAN wire, if it is broken. ③ Check the terminal connection faulty or properly. ④ Replace the MTP-12CA module. ⑤ Check that the "SELF TEST" LED is flickering and normal analog value is displayed for each channel on the FND.	-
About M-TB			
6 Low insulation resistance	① Wrong connection of shield wiring. ② Conversion of CR1 or CR2 parts characteristics by surge voltage or overcurrent ③ Damage of fuse and CR1, CR2 parts by AC power.	① Check the shield wire connection state. And check the short circuit of power line and shield line. ② If the resistance is less than MΩ, replace the M-TB. ③ When the AC power was supply by mistake, fuse and CR1, CR2 parts may be damaged by overcurrent. If the CR1 or CR2's resistance is less than MΩ, replace the M-TB	-
	About the CR1, CR2 parts… CR1, CR2 are transient voltage suppressor. Due to this parts, the internal circuit is protected from surge voltage and overcurrent. But can not eliminate the surge voltage and overcurrent by this parts. So, insulation resistance can be reduced by repetitive surge voltage and overcurrent. Especially, if the AC power was supply by mistake, more likely to damage of insulation resistance		

KOMECO

ENG. TYPE	TROUBLE SHOOTING	PART3
Standard	(Control & Monitoring system)	14/14

Table 2.

Trouble	Possible cause	Trouble shooting	Remark
The others			
Not display anything on the FND. (ADU/ETM/MTP)	① Power supply failure. ② System failure.	① Check the main power source. ① Check the fuse on M-TB. ② Replace the module.	-
CONTROL SOURCE FAIL	① Power supply failure. ② Internal component defect by internal / external factors	① Check the main power source. ② Check the "X3-17,18" terminal's contact is "CLOSE" state. ② Replace the module, if the power source is normal and open contact state.	-

PART 1. GENERAL

PART 2. FUNCTION EXPLANATION

PART 3. TROUBLE SHOOTING

PART 4. SETTING

Page 1/17 ~ 4/17 : Analog & Digital Unit(ADU-36-TCP, U1)
Page 5/17 ~ 8/17 : Main Control Unit(MCU-56-DIO, U3)
Page 9/17 ~ 12/17 : Speed Measuring Unit(SMU-08 -SC, U2)
Page 13/17 ~ 14/17 : Main Bearing Temp. Module(BTM)
Page 15/17 : Soft. Number
Page 16/17 ~ 17/17 : RS485-422 Select method

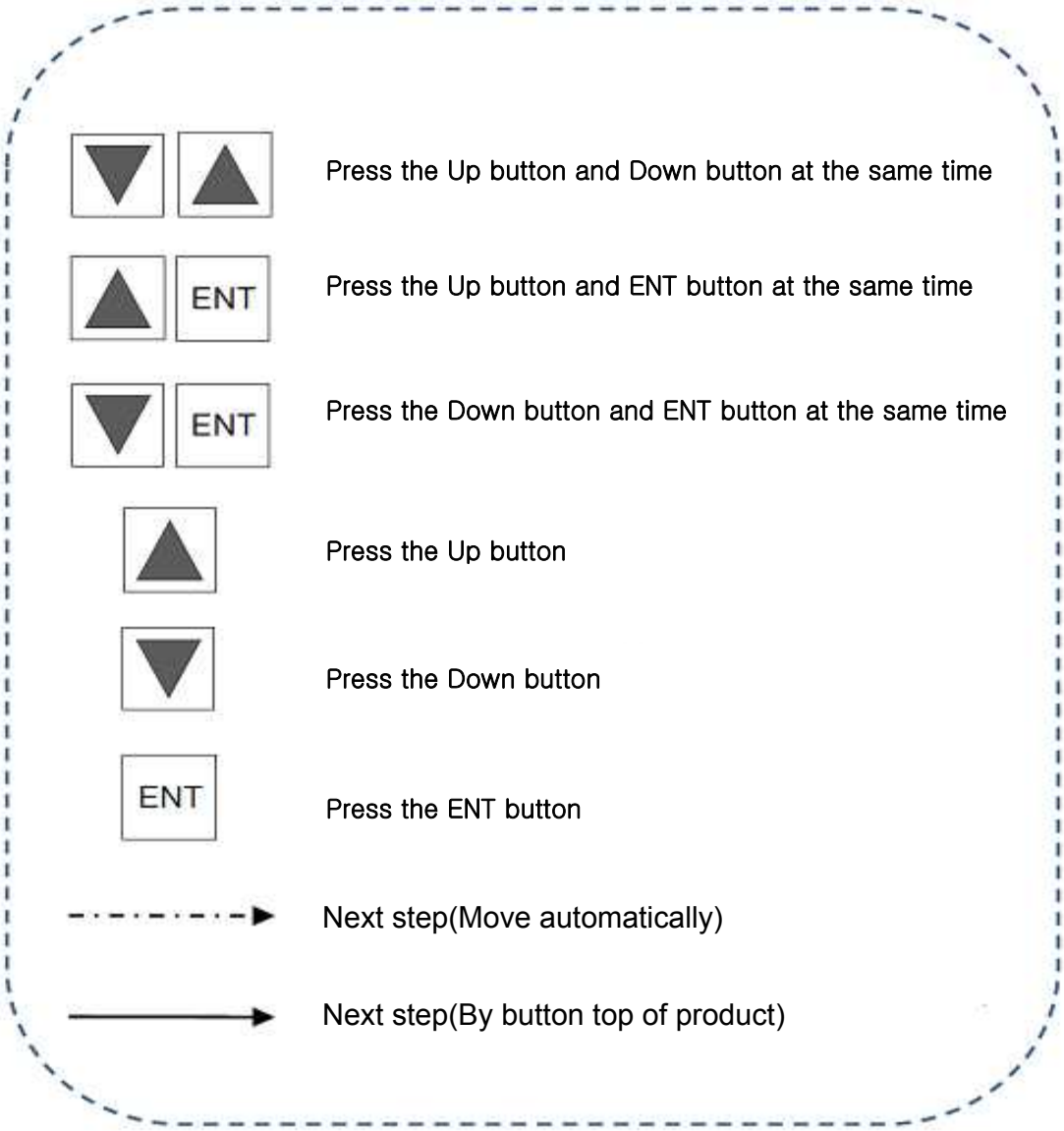


CAUTION

If the setting is needed, manager or controller can set this using portable Calibrator(CA71) equipment.
Setting should be set after familiarize manual.

- When setting the zero value and span value, must be set the Span value after Zero value setting first.
- If the span value set first, may not be display the temperature and pressure. If not, temperature and pressure variations can occur.

* You need to know well about bottom before entering setting mode Please.

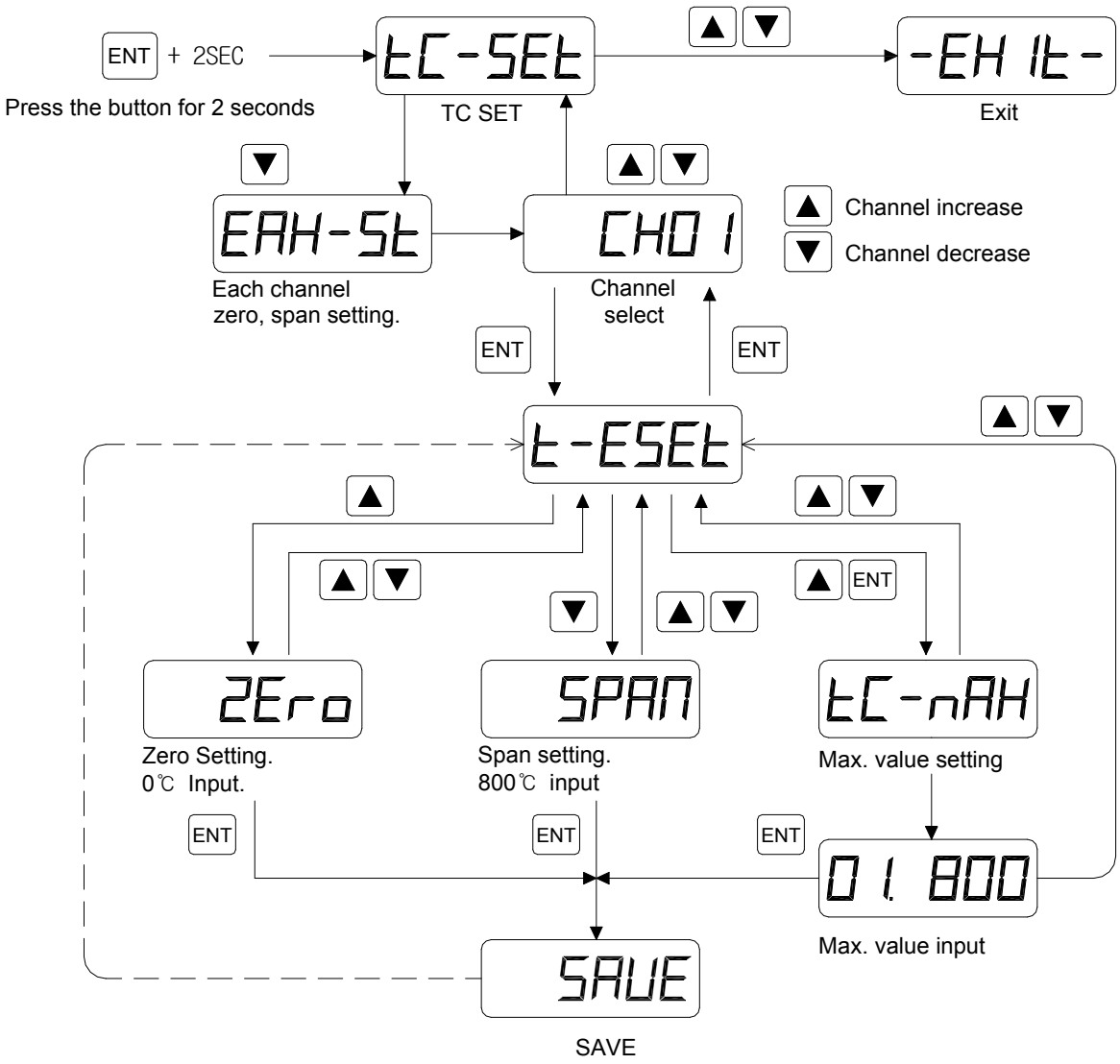


KOMECO

ENG. TYPE	SETTING (Analog & Digital unit setting)	PART4
Standard		1/20

ADU unit thermocouple setting(each channel setting)

Please connect the cable in the Thermocouple input terminal of Main terminal board.
Follow process below to set up with Calibrator(CA71) after select 100mV TC(K type) mode.

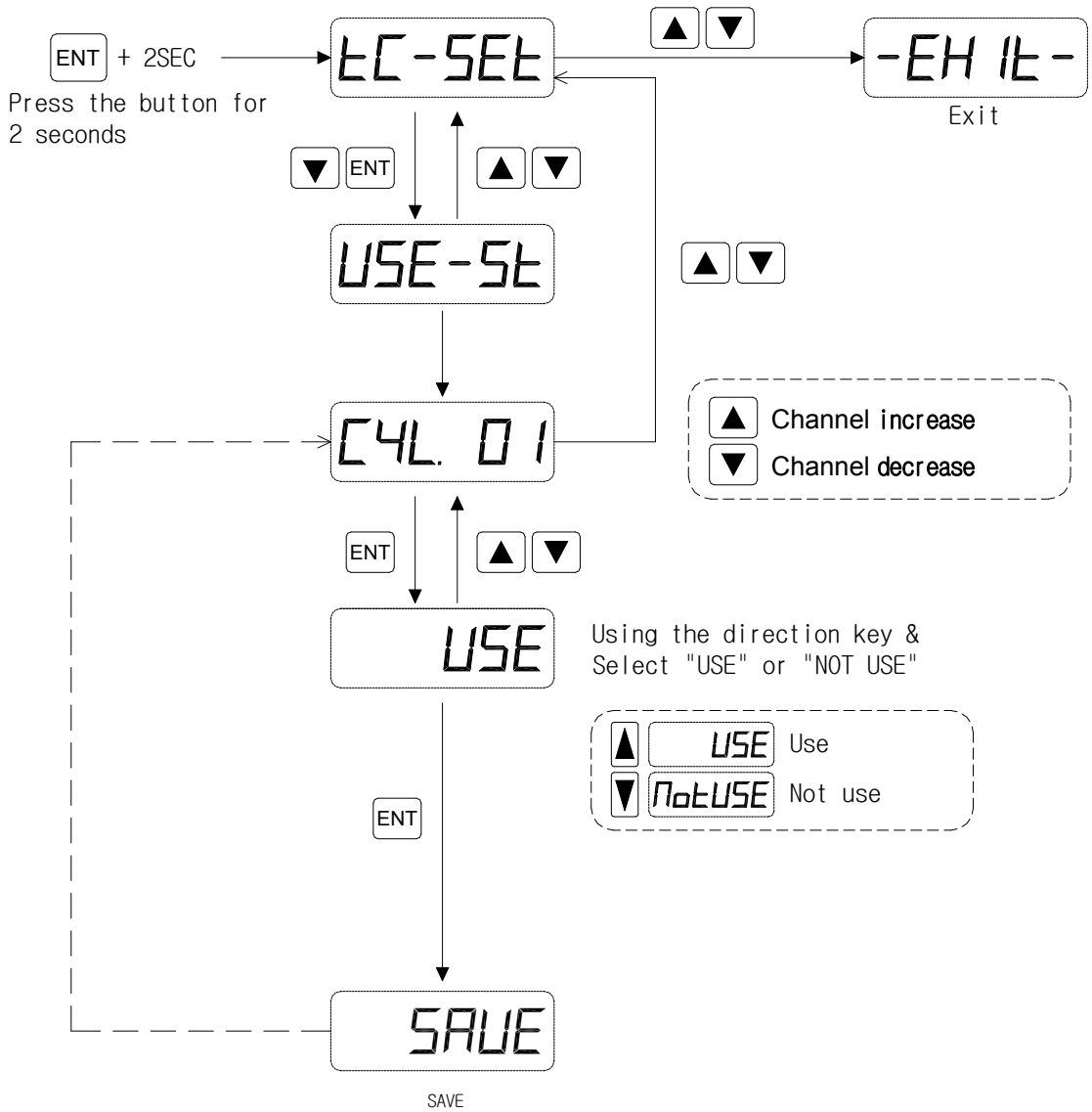


KOMECO

ENG. TYPE	SETTING(Analog & Digital unit setting)	PART4
Standard		2/20

ADU unit cylinder use or not use setting

If it selects USE in cylinder use setting, it displays after recording thermocouple signal.
And If it selects “NOTUSE”, channel indicates only “0”



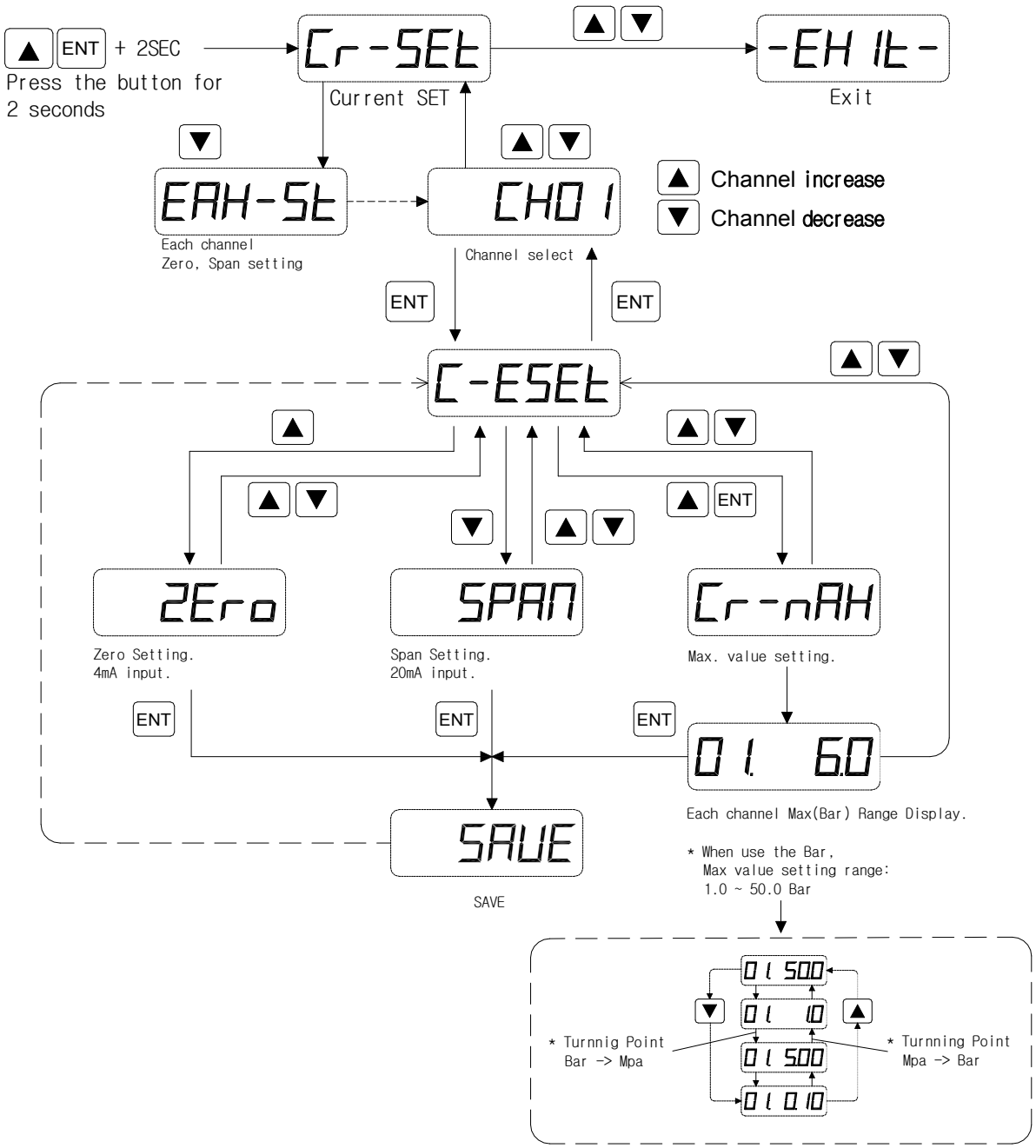
KOMECO

ENG. TYPE	SETTING(Analog & Digital unit setting)	PART4
Standard		3/20

ADU unit current setting1 (Bar mode)

3

Please, connect the cable in the Current input terminal of Main terminal board.
Follow process below to set up with Calibrator(CA71) after select 20mA sink mode.



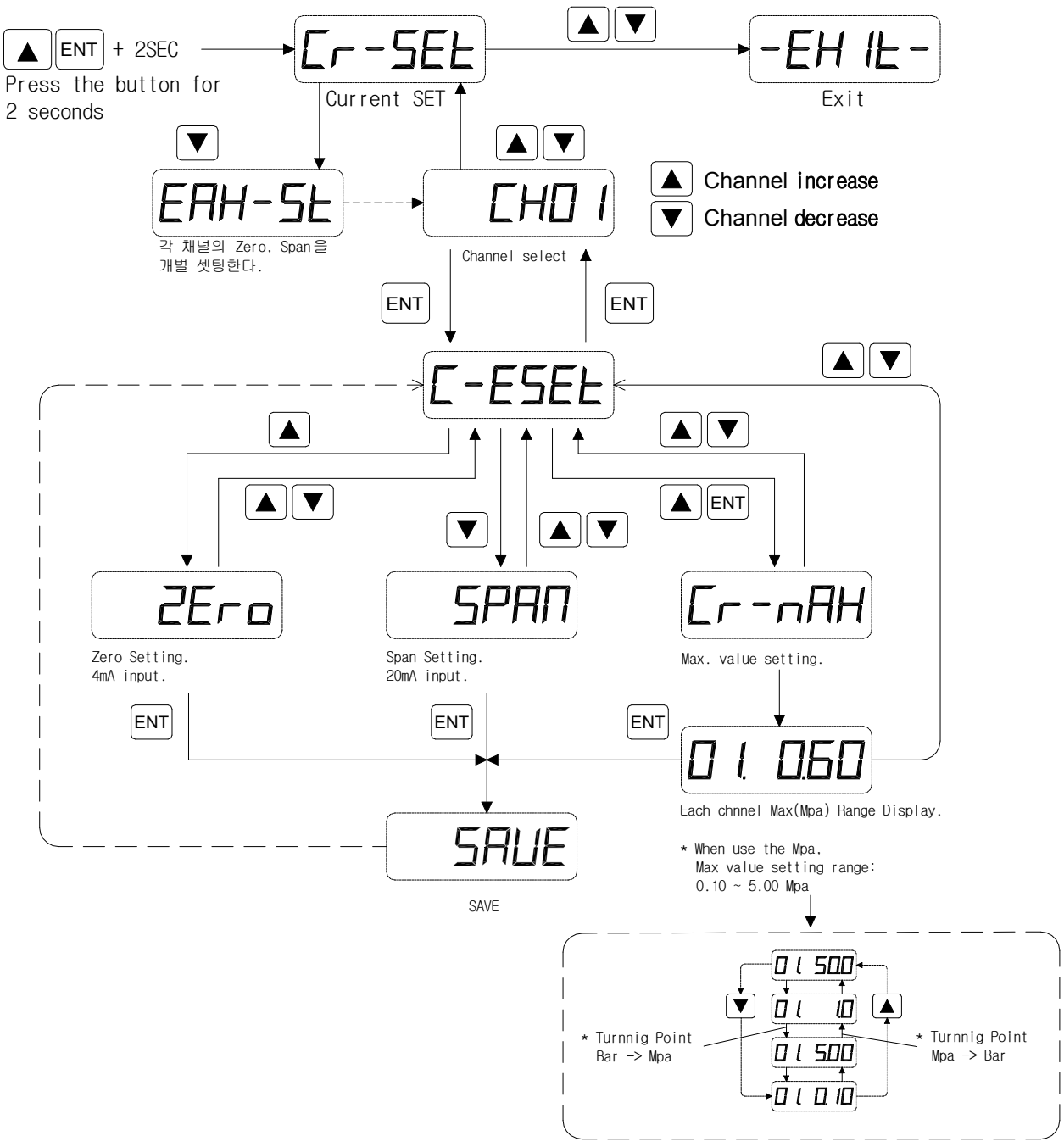
KOMECO

ENG. TYPE	SETTING(Analog & Digital unit setting)	PART4
Standard		4/20

ADU unit current setting2 (Mpa mode)

3

Please, connect the cable in the Current input terminal of Main terminal board.
Follow process below to set up with Calibrator(CA71) after select 20mA sink mode.

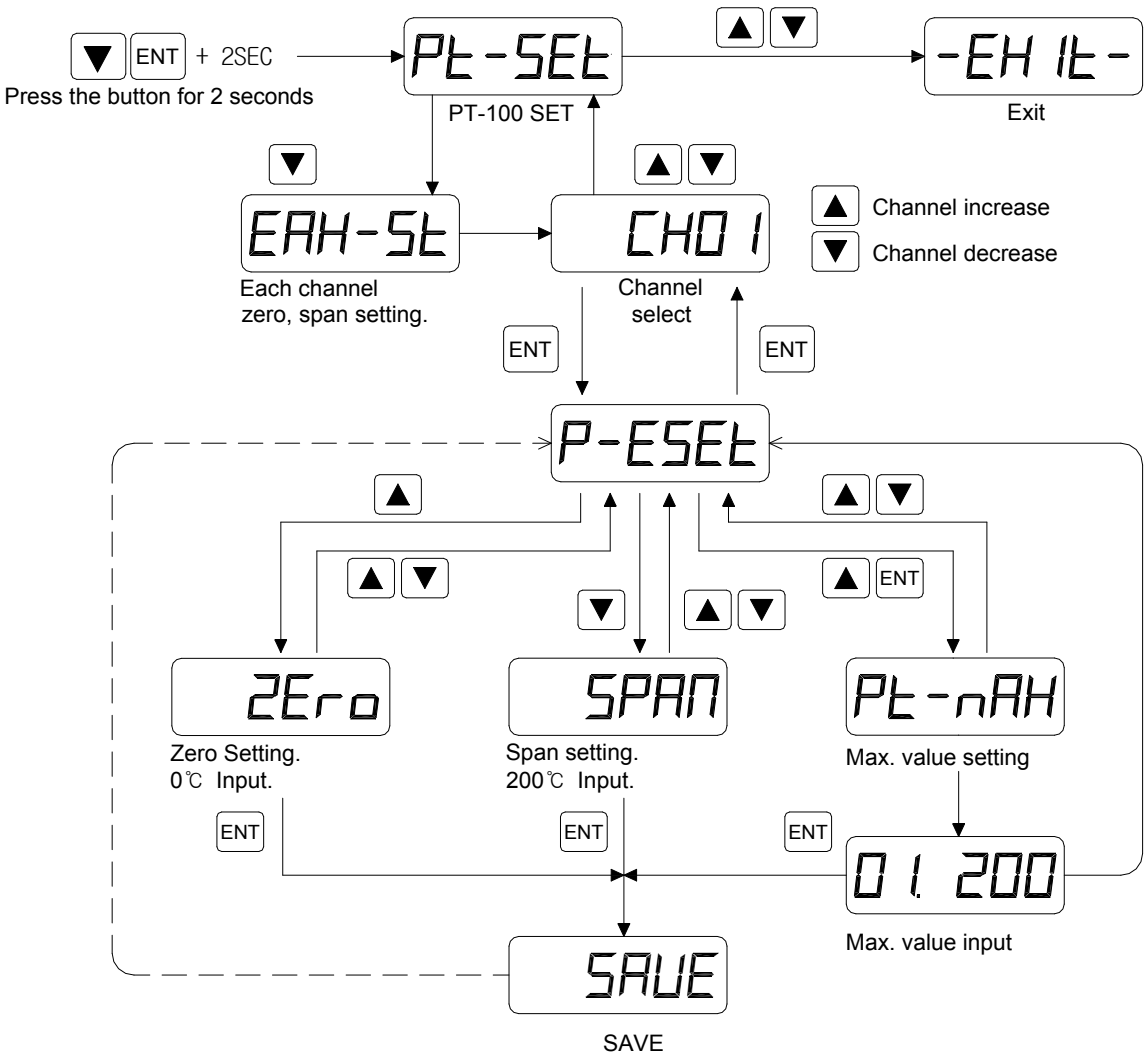


KOMECO

ENG. TYPE	SETTING(Analog & Digital unit setting)	PART4
Standard		5/20

ADU unit PT100Ω setting

Please, connect the cable in the PT100Ω input terminal of Main terminal board.
Follow process below to set up with Calibrator(CA71) after select 400Ω RTD mode.

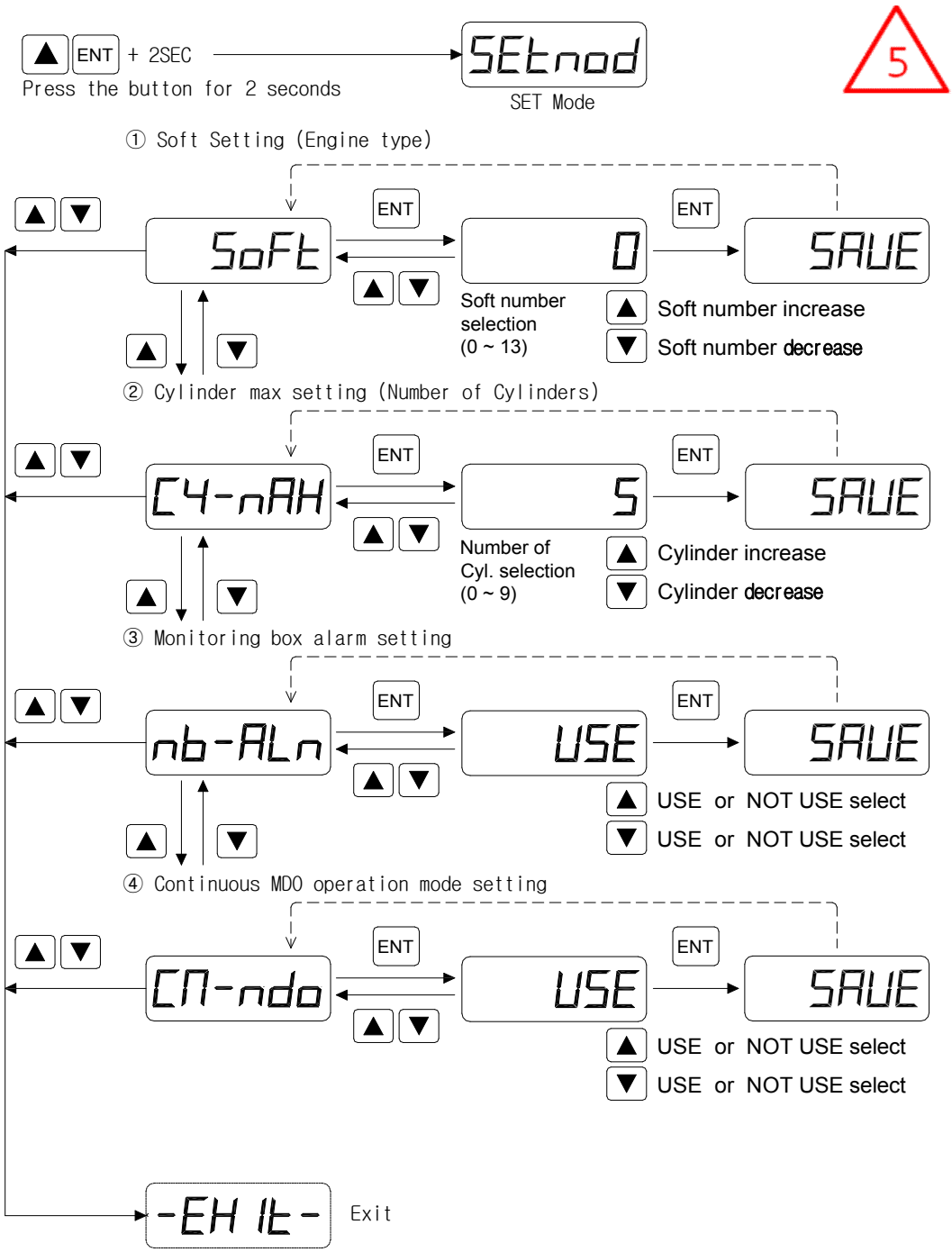


KOMECO

ENG. TYPE	SETTING(Main control unit setting)	PART4
Standard		6/20

MCU unit soft. cylinder max, monitoring box alarm, continuous MDO operation mode setting

Please, set up Soft., cylinder max., monitoring box alarm, continuous MDO operation mode with reference of below setting process, after confirmation Engine type to set up.

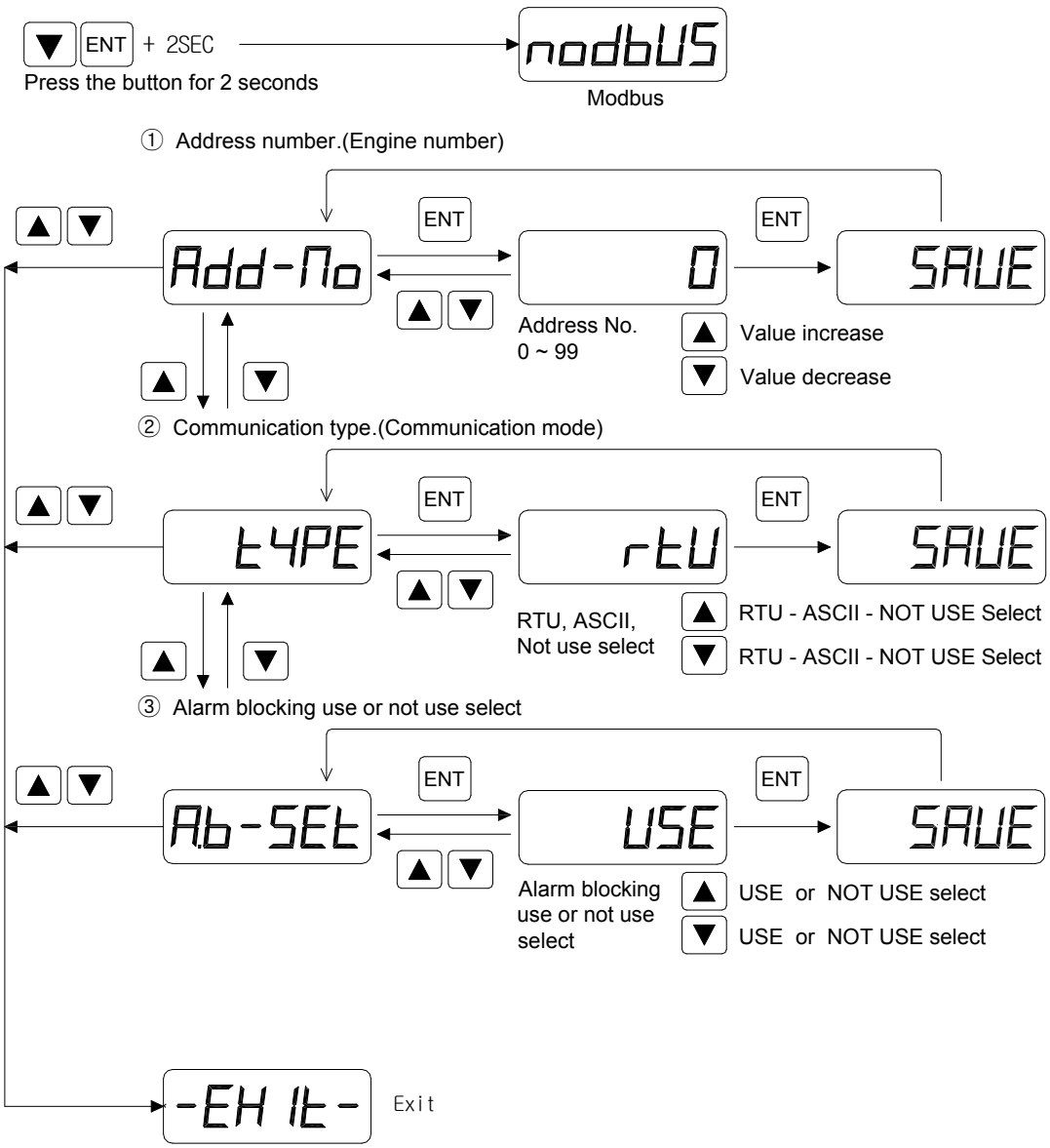


KOMECO

ENG. TYPE	SETTING(Main control unit setting)	PART4
Standard		7/20

MCU unit modbus setting

Please, set up address number, communication type, alarm blocking use select with reference of below setting process.

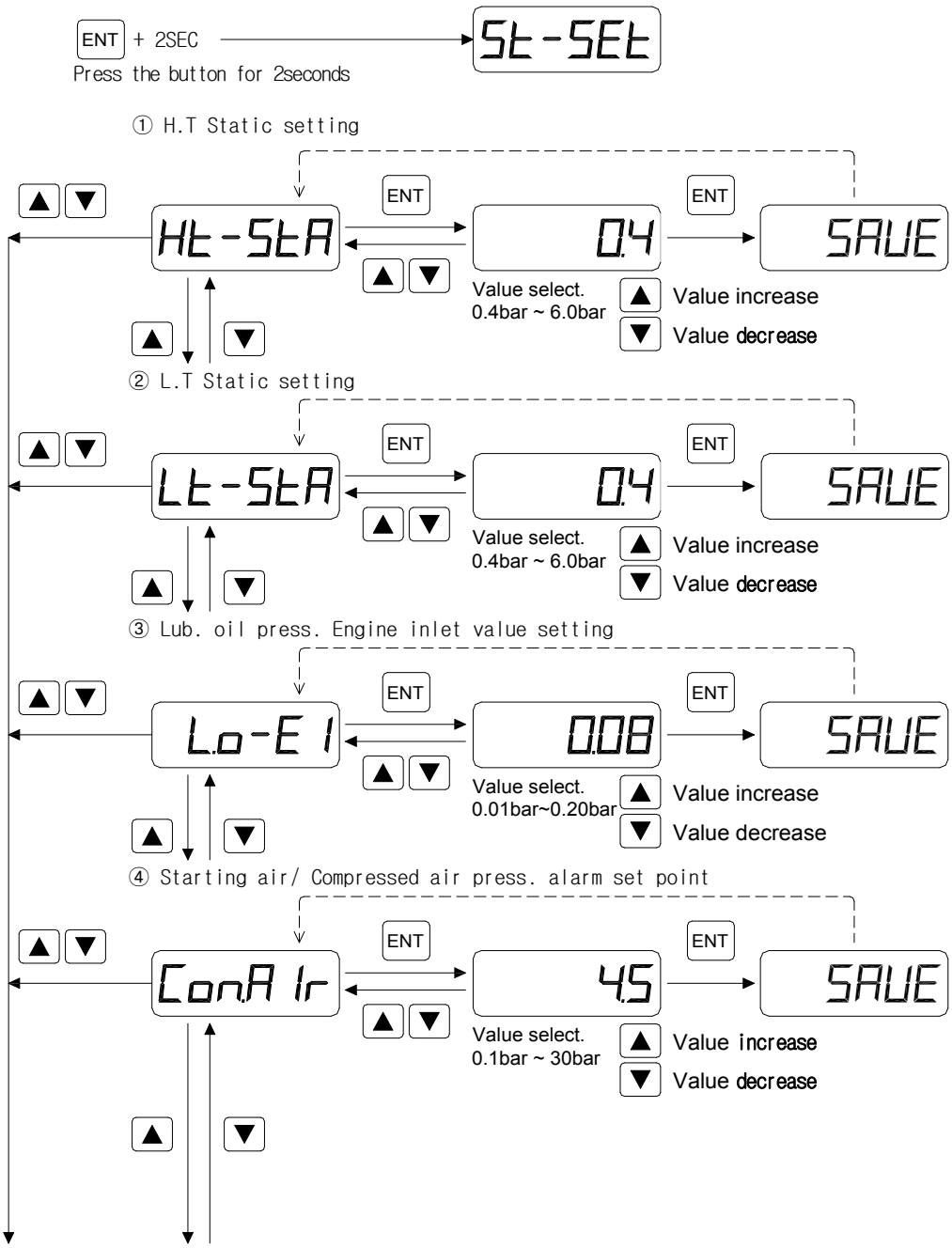


KOMECO

ENG. TYPE	SETTING(Main control unit setting)	PART4
Standard		8/20

MCU unit static setting1 (Bar mode)

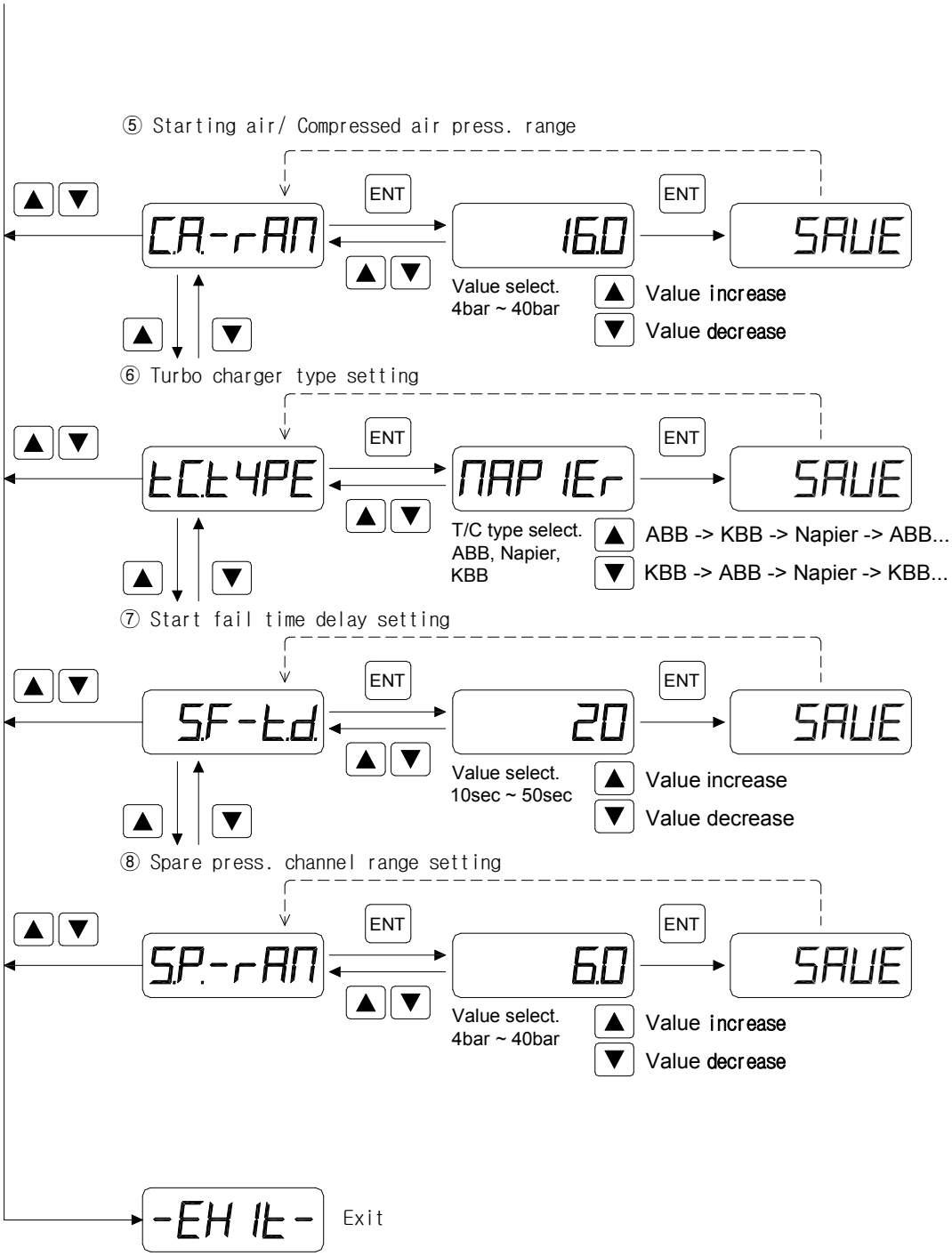
Please, set up H.T static, L.T static, L.O Press, Starting air press, turbo charger type, start fail time, spare channel press. with reference of below setting process.



Next page.

KOMECO

ENG. TYPE	SETTING(Main control unit setting)	PART4
Standard		9/20



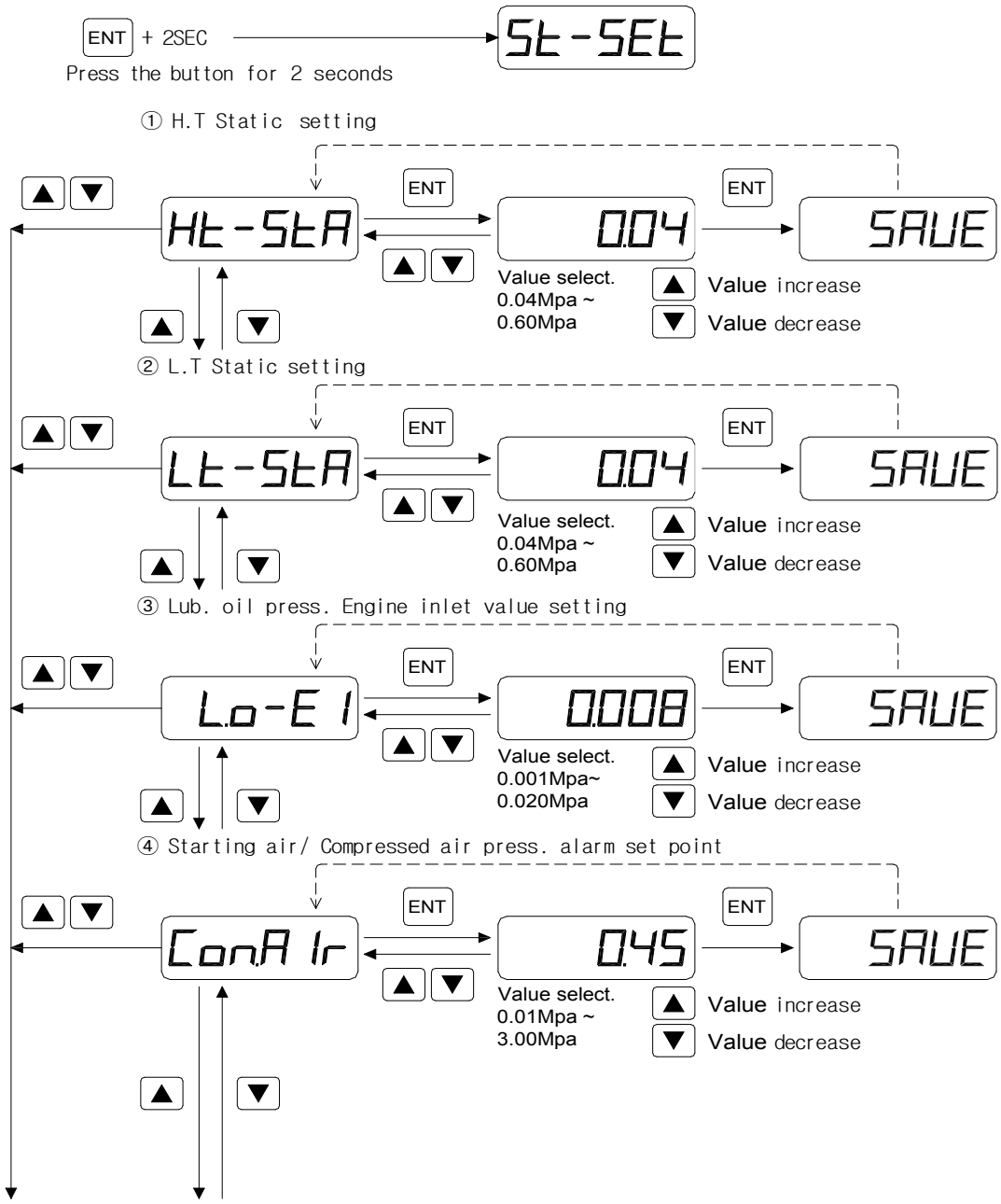
KOMECO

ENG. TYPE	SETTING(Main control unit setting)	PART4
Standard		10/20

3

MCU unit static setting2 (Mpa mode)

Please, set up H.T static, L.T static, L.O Press, Starting air press, turbo charger type, start fail time, spare channel press. with reference of below setting process.

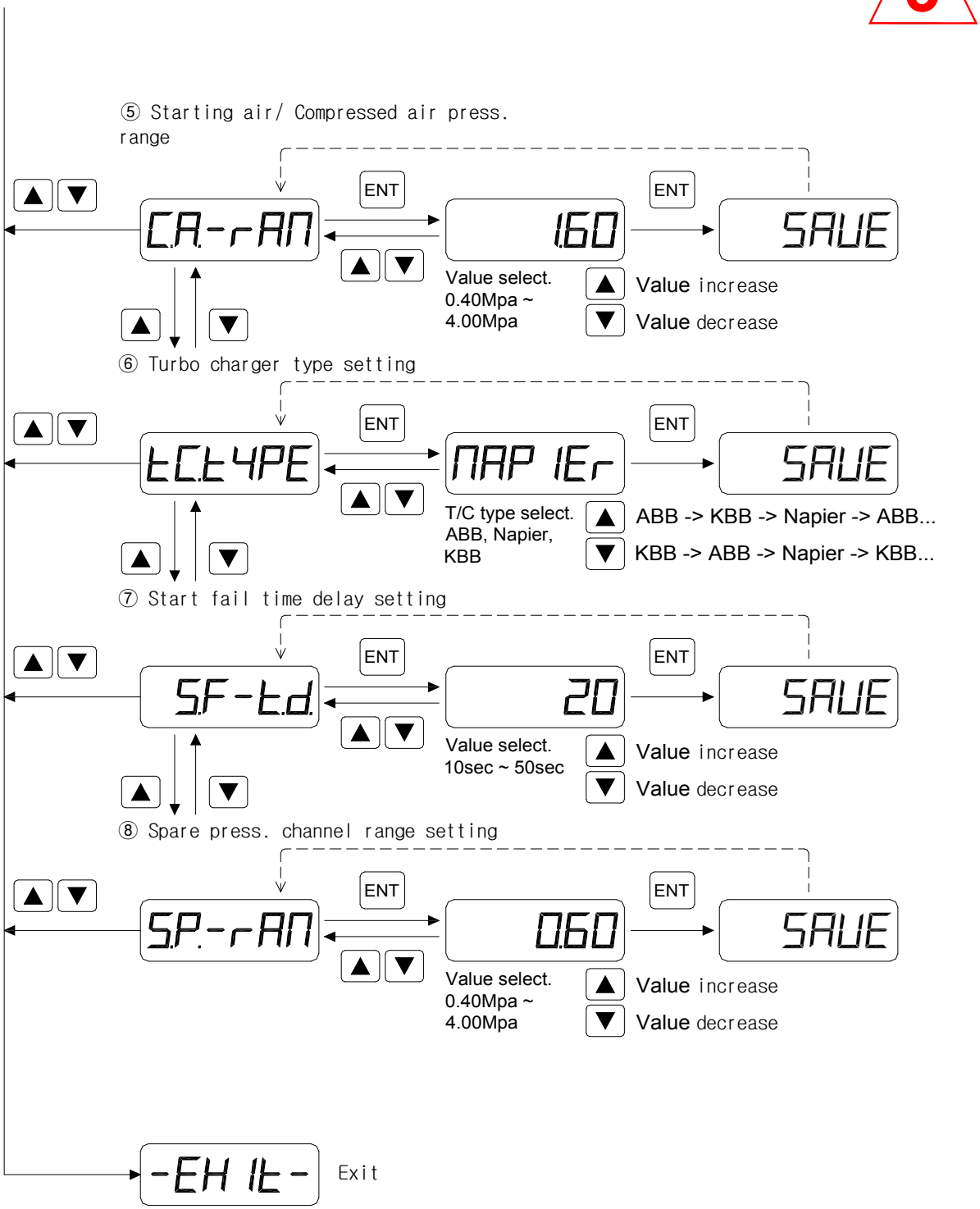


Continnue..

KOMECO

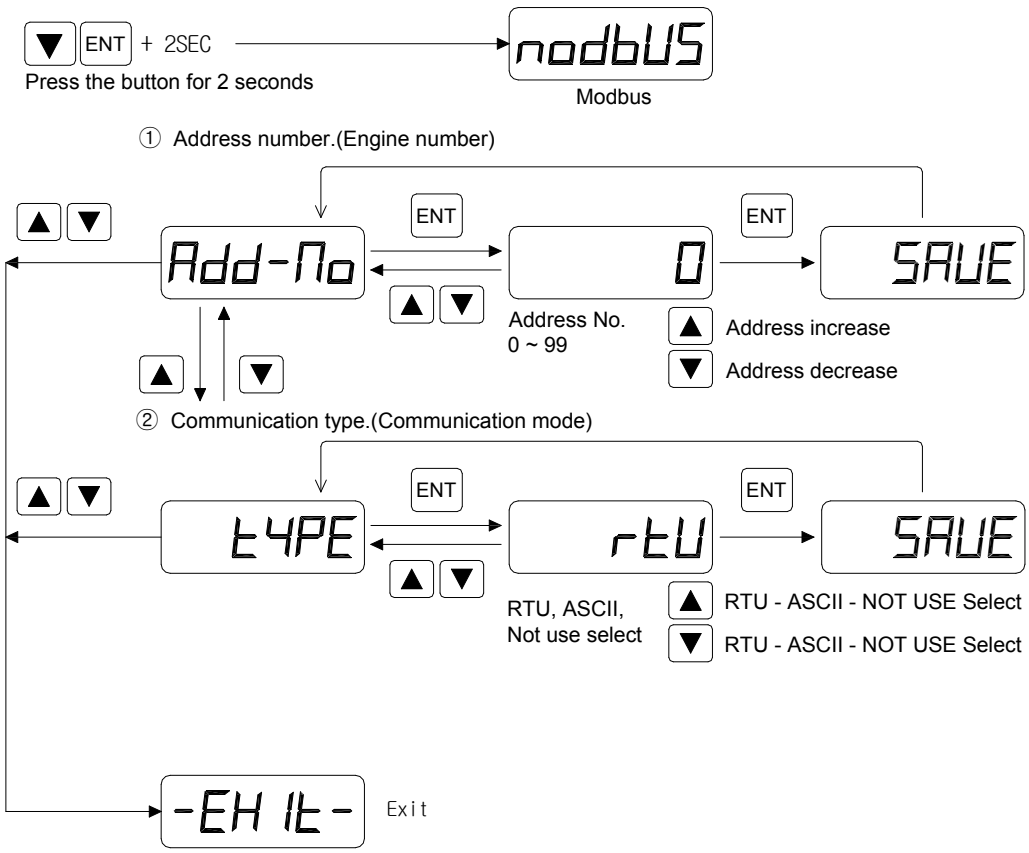
ENG. TYPE	SETTING(Main control unit setting)	PART4
Standard		11/20

3



SMU unit modbus setting

Please, set up address number, communication type with reference of below setting process.

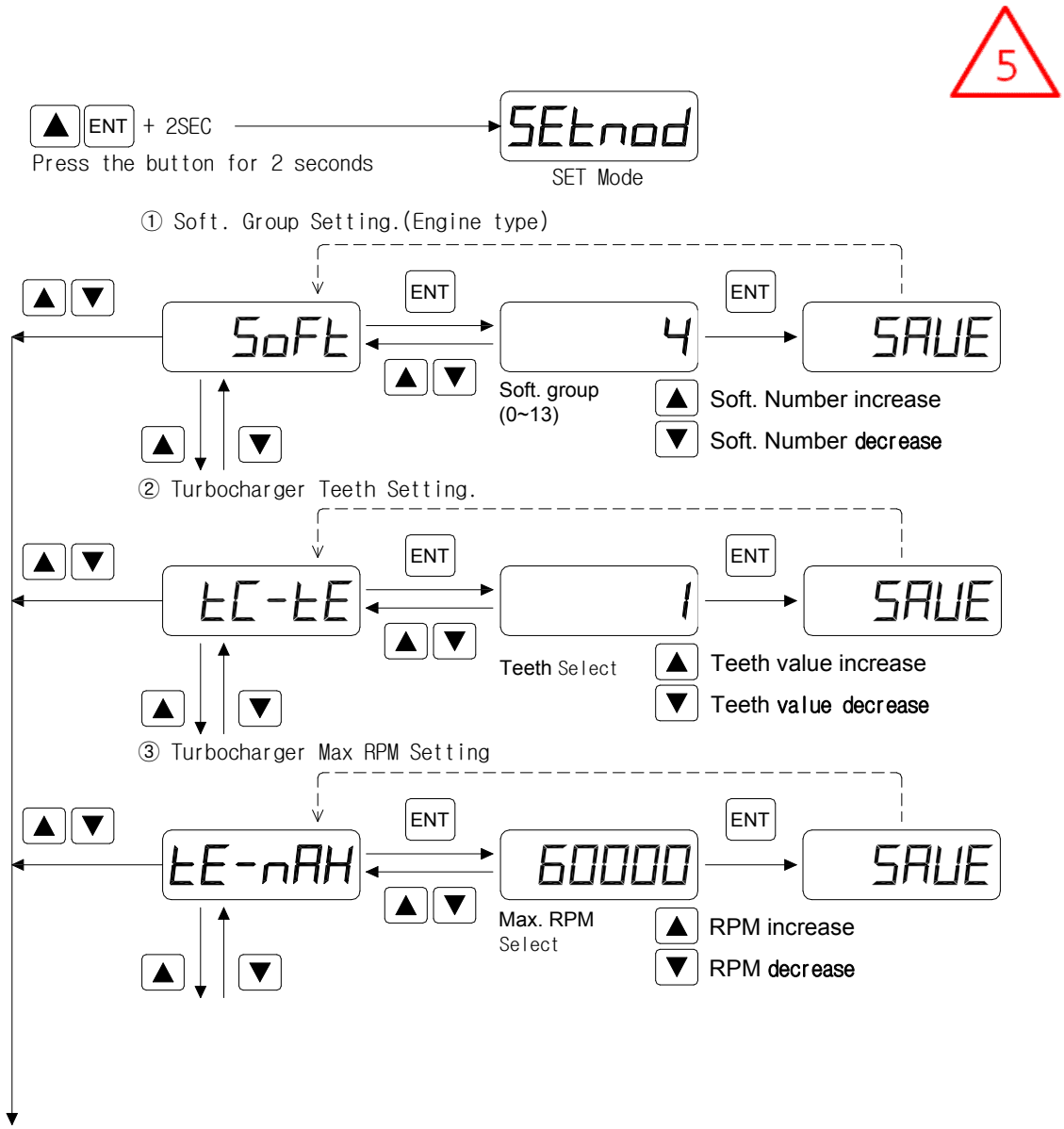


KOMECO

ENG. TYPE	SETTING(Speed measuring unit setting)	PART4
Standard		13/20

SMU unit Sodt, RPM, Teeth setting

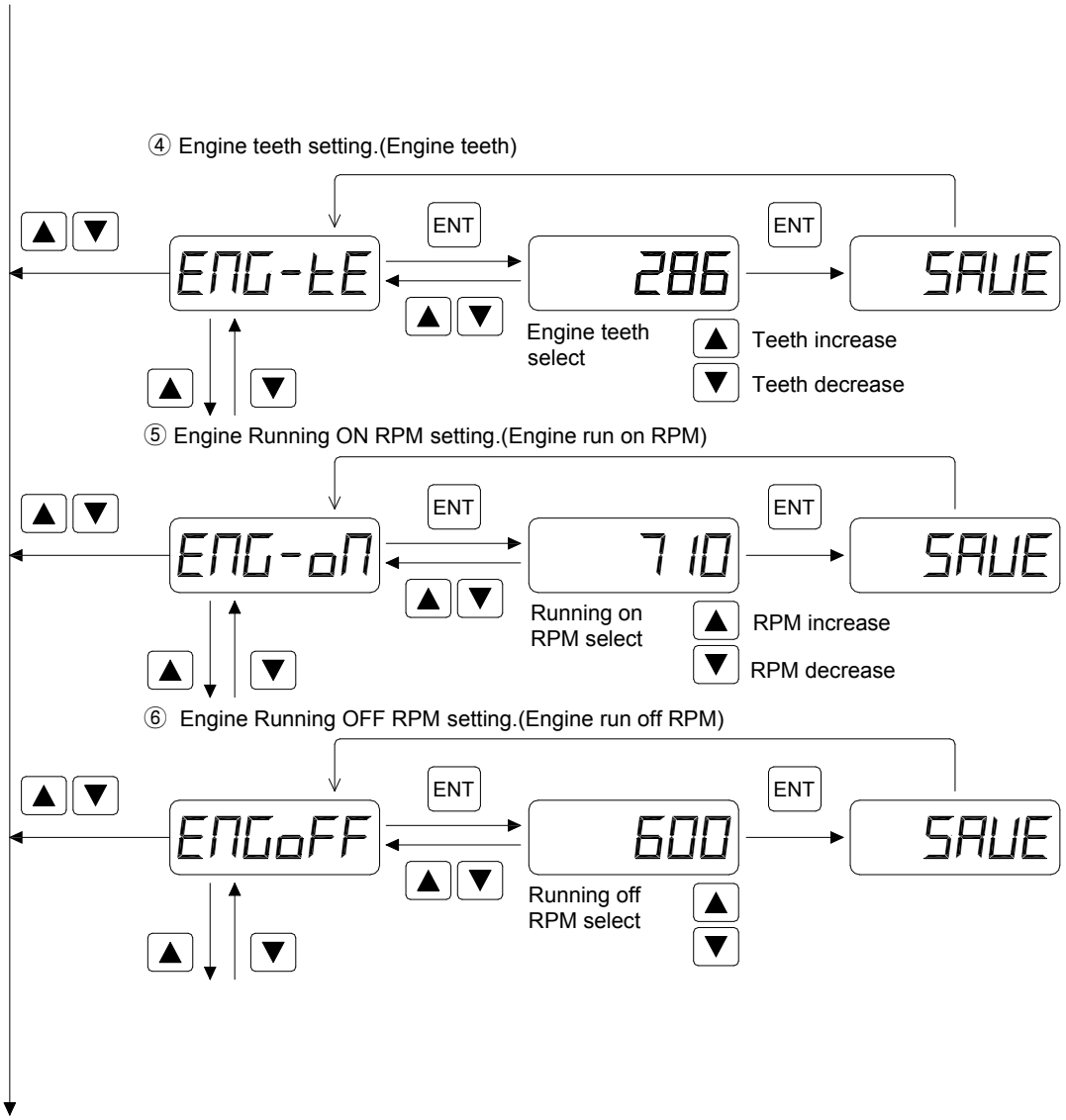
Please, set up soft. group, T/C teeth, T/C max rpm, T/C running rpm, T/C overspeed rpm, Eng. teeth, Eng. running on-off rpm, Eng overspeed rpm with reference of below setting process.



Continnue..
(Engine teeth, Running ON/OFF RPM setting)

KOMECO

ENG. TYPE	SETTING(Speed measuring unit setting)	PART4
Standard		14/20

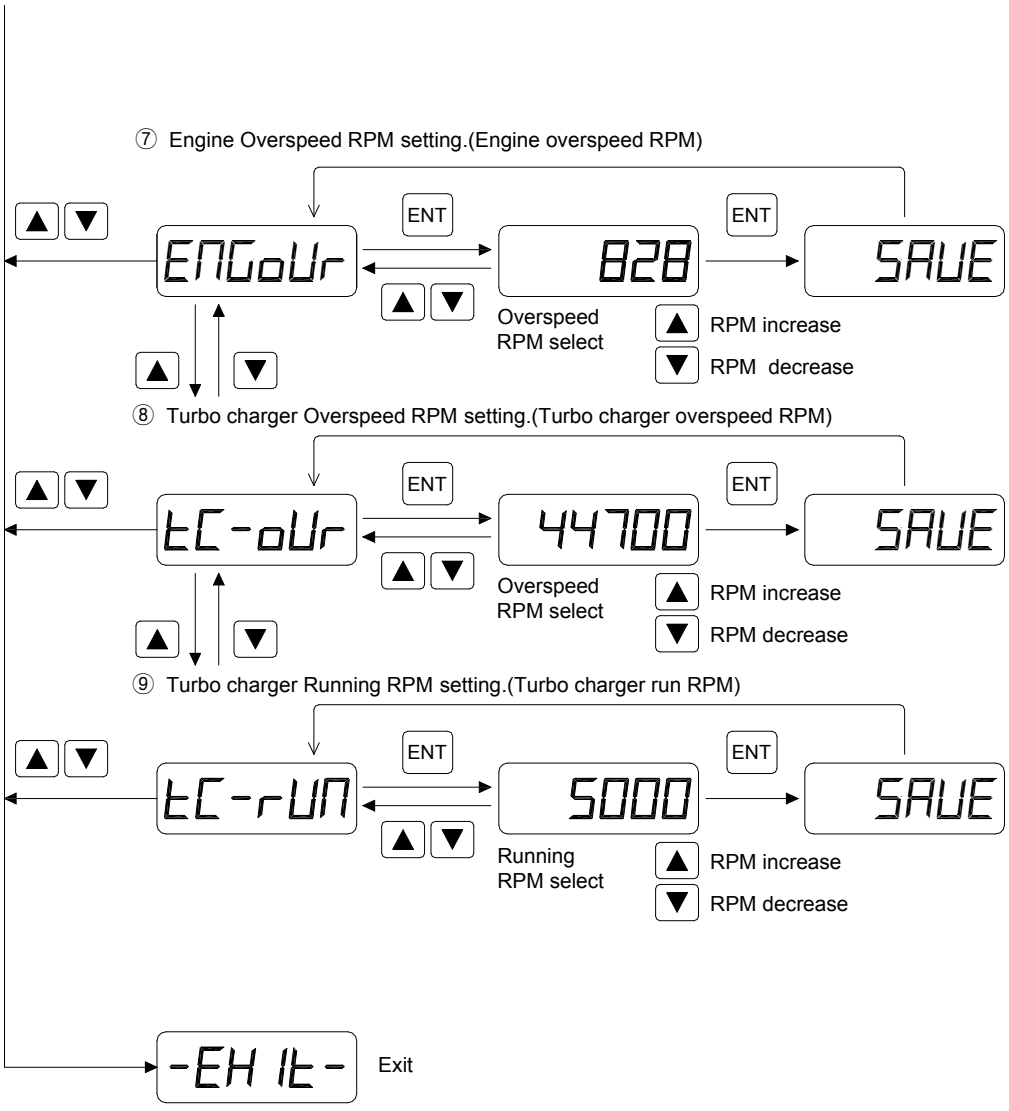


Next page

(Engine / Turbocharger overspeed RPM, Turbocharger running RPM setting)

KOMECO

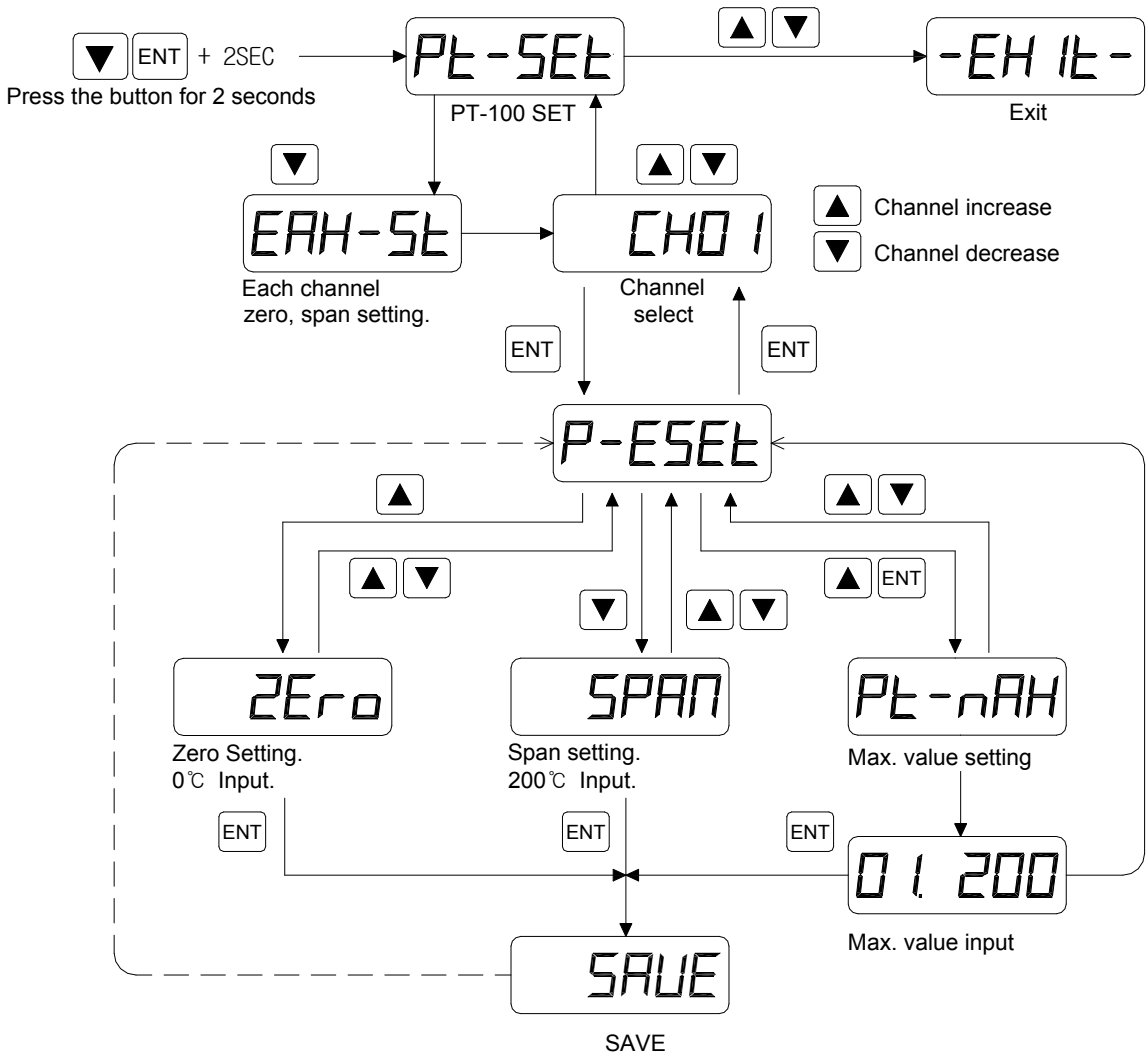
ENG. TYPE	SETTING(Speed measuring unit setting)	PART4
Standard		15/20



BTM unit PT100Ω setting

2

Please, connect the cable in the PT100Ω input terminal of Main bearing temp. module.
Follow process below to set up with Calibrator(CA71) after select 400Ω RTD mode.



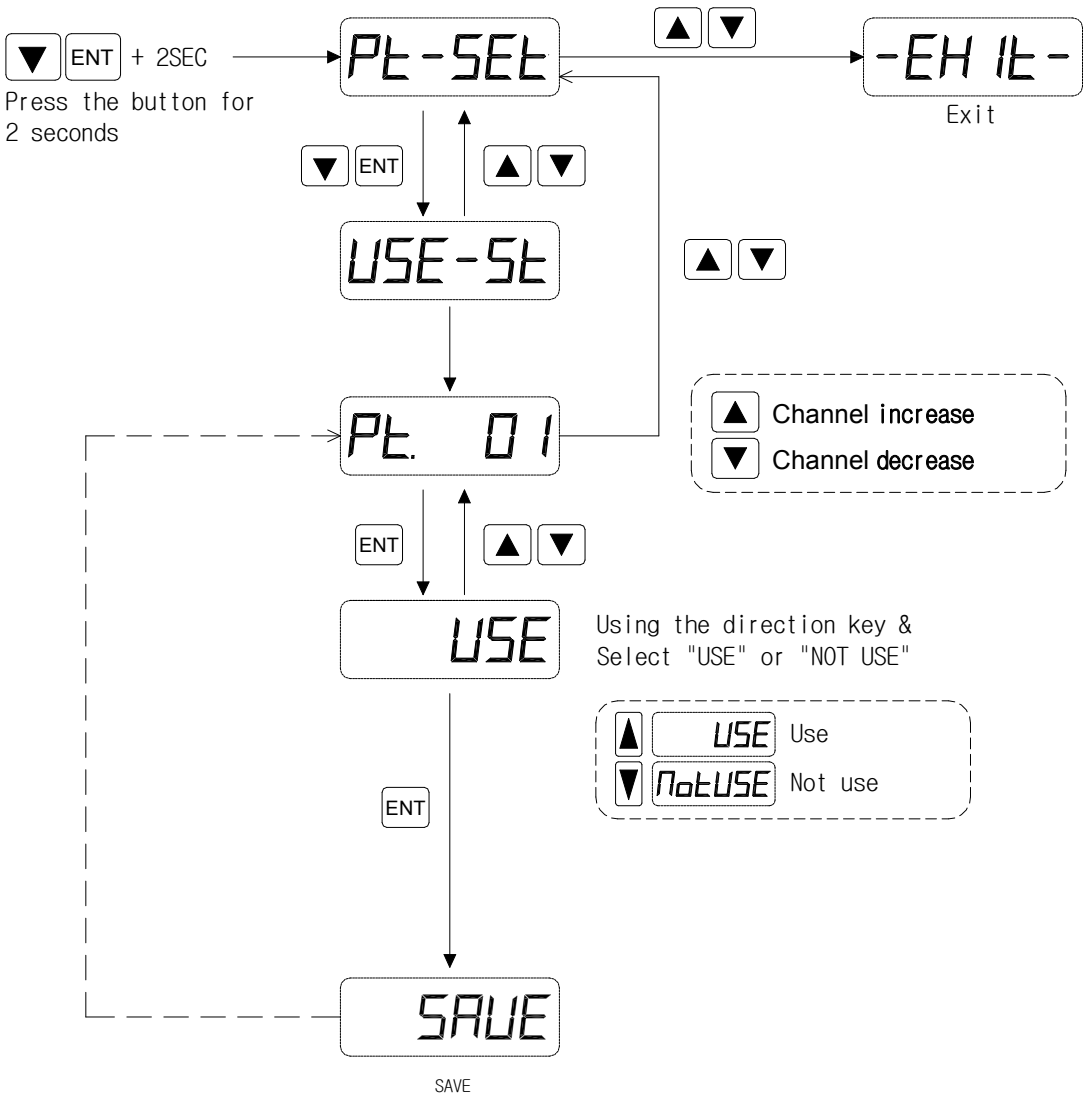
KOMECO

ENG. TYPE	SETTING(Main bearing temp. module setting)	PART4
Standard		17/20

BTM unit Bearing temp. channel use or notuse setting

2

If it selects USE in bearing temp. channel use setting, it displays after recording bearing temperature, And If it selects “NOTUSE”, channel indicates only “0”



KOMECO

ENG. TYPE	Soft. number	PART4
Standard		18/20



Soft Number	Engine type	NCR
Soft 0	H21/32	720
Soft 1	H21/32	750
Soft 2	H21/32	900
Soft 3	H21/32	1000
Soft 4	H25/33	720
Soft 5	H25/33	750
Soft 6	H25/33	900
Soft 7	H25/33	1000
Soft 8	H17/28	900
Soft 9	H17/28	1000
Soft 10	H32/40	720
Soft 11	H32/40	750
Soft 12	H17/28U(E)	900
Soft 13	H17/28U(E)	1000

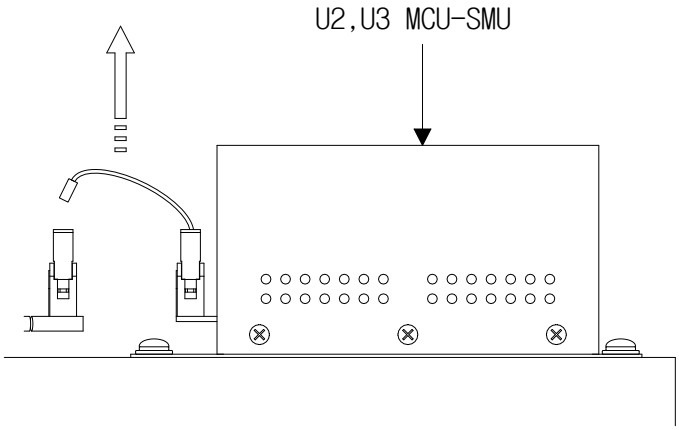
KOMECO

ENG. TYPE	RS485-RS422 Select method(1/2)	PART4
Standard		19/20

1. Turn off the power of terminal box
2. Separate the flat cable of mounting MCU-SMU(U2,U3)

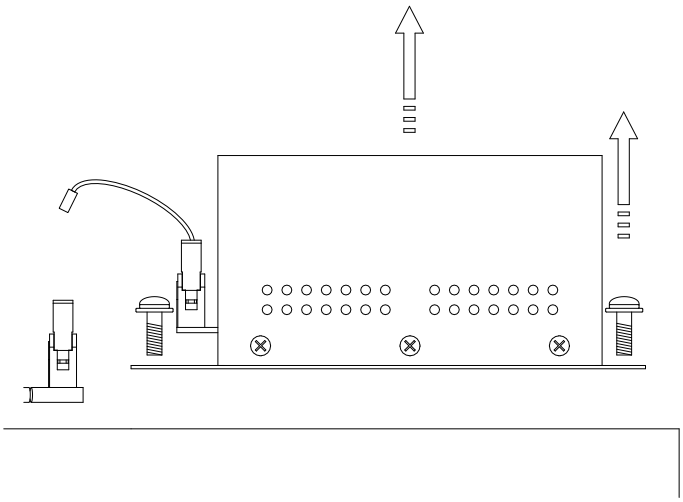
1

* caution : Don't add the power about separate the Flat cable.
There are dangerous of the damaged connector



3. Using the(+) driver, and separate MCU-SMU(U2, U3) unit from the middle plate.

* caution 1: Be careful about forget a bolt.
* caution 2: You must using assigned tools.

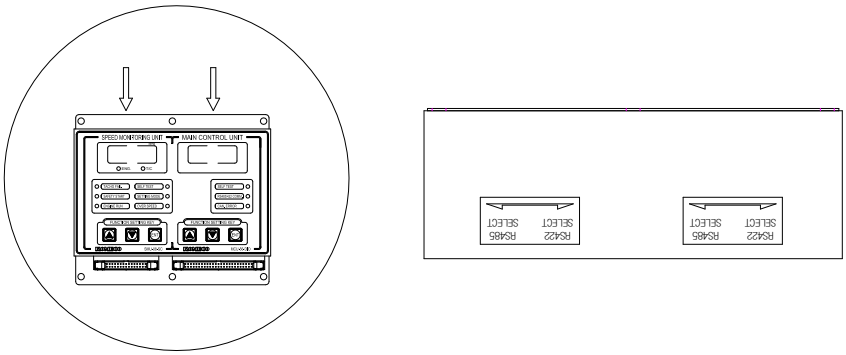


KOMECO

ENG. TYPE	RS485-RS422 Select method(2/2)	PART4
Standard		20/20

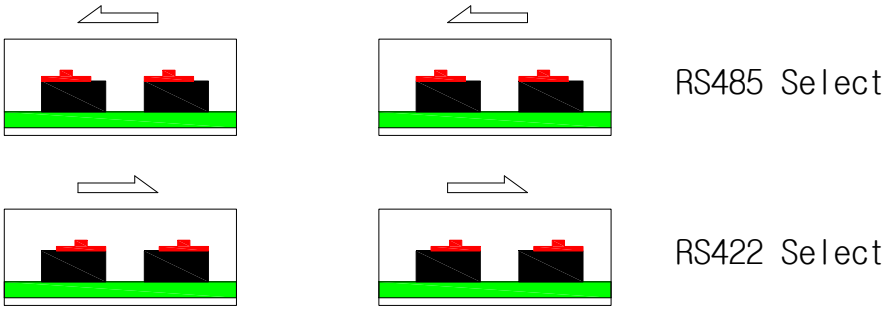
4. Remove two "RS485↔RS422" sticker, on top of the product.

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5. Change a switch to want direction.

* caution: Head of switch is fragile product. So you will change because you have not enough power and used the (-) driver.



6. You again attached this "RS485↔RS422" sticker.

* Caution : You must attach it, about the sticker used to protect from dust & foreign body on the top of product.

7. Using the (+) driver, fixed MCU-SMU unit(U2,U3)
8. You should Connect the flat cable. At this time, the connector must insert completely.
9. Turn on the power of terminal box.