## TTM－210 brief operation manual

Thank you for purchasing our TTM－210．Please thoroughly read this manual．This manual is a brief version of the operation manual
（lease refer to the fulversion of the operation manual（User＇s Manual）for details．（It can be downloaded from our homepage）
Please purchase the loader cable addilionally，when the loader communication is used．（Model：TTM－LOADER） Cautions For safety purpose，following symbols are used in this manual．
1．Warning The case that a user may receive fatal damage，electric shock，or severe burn injury when the product is incorrectly used
\．Cautions The case that a user may receive minor injury or the equipment may get damage
1．Warning $\begin{aligned} & \text { Verify correct wing before turning on electricity since incorrect wiring may cause an equipment failure or a a fire．Modification } \\ & \text { of this equipment may cause malfunctioning or a fire．Do not add modification on this equipment．If the equipment is used in }\end{aligned}$
\．Cautions $\begin{aligned} & \text { Wiring：Do not use empty terminals for irrelevant purposes．} \\ & \text { Operation：Do not use a sharp－pointed tool for operating key．}\end{aligned}$
Hand over this operation manual to a person who actually operates the product． $\begin{aligned} & \text {－Do not reprint or duplicate this manual without permissio } \\ & \text { Content of this manual may be subiect to modification without rior notice．}\end{aligned}$ Keep a password in a note ift it s set．

## （1）：Cautions，Danger，Refere to a manual ©

## Verification of the product



## Prior to control operation

位 form can be switched for storing settings，which stays in the storage even when the power is cu
Match the selected input form with input setting on the product．
PID control and ON／OFF control are possible．Advantage／disadvantage of them are as follows．
PID control and ON／OFF control are possible．Advantage／disadvan
Select the control in consideration of the advantage／disadvantage．
A self－tuning function is equipped on this product so that constants for PID are automatically calculated and reflected to the control at start of control operation or change of SV

|  | PID control |
| :--- | :--- |
| Advantage | Better control result than ON／OFF control |
| Disadvantage | Short service life of the relay due to freque |


| Advantage | Bector control result than ON／OFF control | ON／OFF control |
| :--- | :--- | :--- |
| Disadvantage | Short service life of the relay due to frequent on／off of output | Longer service life of the relay than that of PID contrature fluctuation than that of PID |



| No．of parameters and their desc |  |  |
| :---: | :---: | :---: |
| 01：00（upper line）On delay |  |  |
| 01：00（lower line）Off delay |  |  |
|  |  |  |
| Table 2 Setting of input type：SET1，tem 1，SET2， |  |  |
|  |  |  |
| No． | Type of sensor | Measuring／Setting Range |
|  | K thermocouple | －200．0 to 13 |
| 1 | Jthermocouple | 200．0 to 1200.0 <br> .200 .0 <br> 20000 |
|  | Thermocouple | 200．010 4000.0 |
| 4 | B thermocouple | 50 to 1 |
| 5 | S therrmocouple |  |
| 6 | B thermocouple | oto |
|  | N thermocouple | 200.0 to 1 |
| 8 | U thermocouple | －200．0 |
| 9 | Lthermocouple | 200.0 to |
| 10 | WRes－26 | 0 to 23 |
| 11 | PR40－20 | 0 to 18 |
| 12 | PLII | 0.01013 |
| 13 <br> 14 <br> 1 | Pt100 | 200.010 |
| 14 | JP1100 | －200．010 |
| 15 | 0.10 mVCC | 199999020999 |
| 16 | － 0.5 VCC |  |
| 18 | 1.5 VDC | 19999 to 299999 |
|  | $0-10$ VDC |  |
|  | 420 mADC | 19999 to 299 |
| ＊Setting of input type 2 （SET 2，item 1）is from 16 to 20 |  |  |
| Table 3 Setting of function of function keys：SET3，tem 1 |  |  |
| No． | Function setting |  |
| ＊0 | No function |  |
|  | Digit move |  |
|  | SET21 Operation type setting ant operation mode Contro mode（MD）／Contia －Program mode |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  | Program starts stop |  |
| ＊3 | ${ }_{\text {AT StartAT Stop }}$ |  |
| ＊4 |  |  |
| ＊5 | Screen reverse travel |  |
| ＊6 | ENT |  |
| ＊7 | （ Bank switching |  |
| ＊8 |  |  |
| ＊9 | sV／MV display change |  |
| ＊A | Constant peeration modelprogram mode switching |  |
| ＊ |  |  |
| ＊C | Pause |  |
| ＊d | SET22 call function（SET |  |
| No． | ${ }^{\text {Screen reverse travel }}$ |  |
| ${ }^{0 *}$ |  |  |
| ${ }^{1 *}$ | Pressing time 1 sec |  |
| ${ }^{2 *}$ | Pressing time 2 se |  |
| ${ }^{3 *}$ | Pressing time 3 sec |  |
| ${ }^{4 *}$ | Pressing time 4 sec |  |
|  |  |  |


| Symbol | Character | Descripion |
| :---: | :---: | :---: |
| Rdy | 只口 | Control stop |
| RUN | 只いN | Control sta |
| man | MRN | Manual |
| TIME1 | LME | Timer 1 operation |
| TIME2 | LMEE | Timer 2 operation |
| TIME3 | LMEJ | Timer 3 operation |


| No． | Primary control | Secondary control |
| :---: | :---: | :---: |
| 0 | Disable | Disable |
| 1 | PID | Disable |
| ${ }_{3}$ | ONOFF | ${ }^{\text {Disable }}$ |
| 3 | PID | PID ${ }^{\text {ONOFF }}$ |
| 5 | ONOFF | ONOFF |
| 6 | Position proporionate | Position |

No．

| No． | Control type |
| :---: | :--- |
| 0 | Type $A$（ $o$ ormal） |
| 1 | Typee （overshoot restraint） |



Front panel－names and tasks
2ПรПП

## 



 \begin{tabular}{|l|l}
\hline RDY \& RDY lamp（to light up at READY status） <br>
\hline COM \& COM lamp（to ficker duuring communication） <br>
\hline

 

\hline COM \& COM lamp（to ticker during communication） <br>
\hline DII to DI4 \& DI 1 to 4 monitor（It appears when DI 1 to 4 operates） <br>
\hline TMR \& TMR lam（to ligh ep <br>
\hline

 

\hline DII to DI4 \& DI 1 to 4 monitior（It appears when DI 1 to 40 <br>
\hline TMR \& TMR lamp（to light up during timer operation） <br>
\hline TIME \& To light <br>
\hline

 

\hline TIME \& To light up when setting is for timer <br>
\hline
\end{tabular}

C ${ }^{\text {C／} / F}$ To light up when setting is for temperature

 \begin{tabular}{|c|l}
MODE \& $\begin{array}{l}\text { Modede key } \\
\text { To be used when screen is switched．}\end{array}$ <br>
\hline

 

\hline FUNC \& $\begin{array}{l}\text { Function key } \\
\text { To execute set function }\end{array}$ <br>
\hline
\end{tabular} Up key

TT be used for increasing setting value
To be sed for Down key for decresing setting value Down key
To be used dor decreasing setting value
To be used for switching input setting mode

 ！Warning


<br>\section*{}

：Measurement categoonr）of inputs ith not spectifige
his Controlere is at




Talver ssetina of tuctionsos ot timess



Basic flow


${ }_{2}^{10 o h m}$ or less




## Setting items selection

 $\underset{\text { Screr inut contro and ou }}{\substack{\text { sen }}}$



| har |  |  |
| :---: | :---: | :---: |
| $\bigcirc$ | 1 | 2 |
| $\bigcirc$ | ！ | ミ |
| 3 | 4 | 5 |
| $\exists$ | － | G |
| 6 | 7 | 8 |
| $\square$ | 7 | G |
| 9 | Minus | Period |
| G | － |  |
| Slash |  |  |
| ！ |  |  |
| A | в | c |
| F | $\square$ | $\mathrm{E}^{-}$ |
| $D^{(d)}$ | E | F |
| 口 | $E$ | $F$ |
| G | H | 1 |
| － | H | I |
| k | L | M |
| K | L | M |
| N | ， | P |
| 咨 | $\square$ | $\stackrel{\square}{\square}$ |
| R | s | $T(t)$ |
| 只 | G | L |
| u | $v$ | w |
| H | \％＇ | W |
| x | $r$ | z |
| K | － | $\underline{7}$ |

Operation flow diagram

|  |  |  |  | 2）Program Operation Mode |  |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | ${ }_{\text {SET1：}}^{\text {Sede }}$ mout 1 seting |  | SET18：Initial setting mode |  |  |  |  |  | E［ㄴ․․ |  |
|  | key |  | V／4 key | 5 Mode key | $\bigcirc$ MODE Key | $\zeta$ MODE Key | 5 mode key | （3）Mofinction | 5 Mode key | $\zeta$ MODE key |
|  | SET2：Input 2 setting mode |  | SET19：Priority screen setting mode | 2．Step SV display SV（set value） |  |  |  |  |  |  |
|  | V／4 key | ， | v／4 | $\checkmark$ mode key | $\checkmark$ mode key | $\checkmark$ MODE ke | 5 MODE key |  | $\bigcirc$ MODE Key | $\checkmark$ MODE key |
| KELTB | SET3：Key function setting mode |  | SETTO：Bank setting |  |  |  | bMinl 99．Seting of type B mode （Refer to Table 7．） |  |  |  |
|  | V／4 key | 今 |  | mode key | ModE key | MODE key | $\checkmark$ MODE Key | ， | $\bigcirc$ MODE Key | $\square$ MODE key |
|  | SET4：Control setting mode <br> －／A key | $\begin{array}{ll} 5 E L E \\ F L E \\ \hline F \end{array}$ | SET 21：Program function setting mode V／A key |  $\int$ MODE key | $\Omega$ moDE key | MODE key |  <br> $\checkmark$ MODE key | IF： <br> $\Omega$ moi |  | OSET 5 and 6：OUT 1 and 2 setting mode |
| SELOS | SET5：OUT 1 setting <br> mode |  | SET 22：Program setting mode |  |  |  |  | FFil： | aind |  |
|  | V／／ key | \，介 |  | EE Key | MODE Kej |  | $\bigcirc$ mode key | 53 Mode key | 3 MODE key | $\bigcirc$ MODE key |
| FELDE | SETT：OUT 2 seting mode |  | $\begin{aligned} & \text { SEvichin Bank auto- } \\ & \text { seit mod tuction } \\ & \text { selt } \end{aligned}$ |  |  |  |  |  | FFill |  |
|  | V／4 key |  | V／4 key | MODE key | Moot key |  | $\checkmark$ MODE key | 5 MODE Key | 13 MODE key | $\checkmark$ MODE key |
| $\frac{\text { SEEDT }}{\square O L I E}$ | SET7：OUT 3 setting mode |  |  |  |  | （Refer to Table 3．） <br> （Displayed in order from function IT MODE Key | ELinill $\begin{gathered}\text { 13．Seting of tuning type } \\ \text { Refer it Pable } 8 \text { ．}\end{gathered}$ （Reeter to Table 8．） |  |  |  |
| ， | V／4 key | onst | peration Mo | mode ke | $\checkmark$ MODE |  | $\checkmark$ MODE key | 5 Mode key | $\checkmark$ mode key | $\bigcirc$ mode key |
|  | SET8：OUT 4 setting mode | E9 | 1．PV／sV screen | 8．Priority display 1 display 1 to 16 in in romer）prority dispay 1 to 16 in order |  | $010$ |  |  |  |  |
|  | V／4 | 5 mo | de key | MODE key | $\checkmark$ Mode key |  | 5 mode key | 5 MODE key | 3 MODE key | ，MODE key |
| EEEDG | SET9：OUT 5 setting mode |  | 2．Timer 1 monitor | 23．Proioity display 16 |  | 1：All lock <br> ：RUN mode lock 3：Lock except RUN mode 4．All lock（ RUN only） |  |  |  |  |
|  | V／4 key | $\checkmark$ Mo | de key | MODE key | MODE key | Rem | $\checkmark$ mode key | 3 mode key | 3 Moob key | 5 MODE Key |
| SEE M | SET10：OUT 6 setting mode |  | 3．Timer 2 monitor |  |  |  |  | 33．Setting of primary control （0： $\mathrm{SV}, 1:$ up， 2 ：intermediate， 3：low） |  |  |
| v | V／ | ，M | de key | Input 1 setting mode | Remote SV setting mode | －SET 4：Control setting mode | ，MODE Key | MODER | $\bigcirc$ M MODE key | 53 MODE Key |
|  | SET11：OUT 7 seting | $0$ | 4．Timer 3 monitor |  | FIEIT： 0 ．Setiting item selection | SEE［TIU |  |  |  |  |
|  | V／4 key | 5 mo | de key | 5 Mode key | －MODE key | 3 MODE key | 5 MODE key | 3 mode key | MODE Key | $\checkmark$ MODE key |
| FEL | SET 12：CT seting mode | Pace | 5．Priority screen 1 （Displayed from priority screen 1 to 16 in sequence arn 10 in sequence |  | INTP? |  |  |  | ［P］ |  |
|  | V／4 key | $\checkmark$ Mod | de key | $\checkmark$ mode key | $\checkmark$ MODE key | $)^{\text {MODE Key }}$ | $\checkmark$ MODE key | $\checkmark$ Mode key | 3 MODE key | 5 MODE Key |
| $\begin{array}{r} \text { FEL } 3 \\ 0.1 \\ \hline \end{array}$ | SET 13：D I seting mode | 8race | 20．Prioity screen 16 | FSIM 2 2．Stiting of scaling ypoer | 2．Setingo of scaling upper init <br>  unireverens on nhe input the est tor input 1） |  | $\begin{array}{l\|l}  & \text { 19. Seting of difierentiation } \\ \text { time } \\ \text { time } & \text { to } 3600 \mathrm{sec} \text { ) } \end{array}$ |  |  |  |
| तु 介 |  | $\Omega$ |  | $\bigcirc$ MODE Key | $\checkmark$ MODE Key | $\checkmark$ MODE key | 5 Mode key | 5 mode key | $\bigcirc$ mode key | $\checkmark$ MODE key |
|  | SET14：Timer 1 setting <br> mode | To 1 |  |  | 3．Setting of scaling lower limit SUV seting range owe limit to FSH2） （Unit depends on the input tye ese for input 1 ） |  | 20．Primary control proportional interval of 1 for sec $\operatorname{SSR}$ drive output |  |  | $E$ IV： 9 Seting of event |
|  | V／4 key |  |  | $\bigcirc$ Mode key | MODE key | MODE key | 5 MODE key | $\checkmark$ MODE key | $\bigcirc$ mode key | 5 MODE Key |
|  | SEET15：Timer 2 seting mode |  |  | To4 | To4 | 5 <br> 4．Seting of SV Imitier upper limit Setifogrange upper initit Analogute hout SLL＋500 OSV seting arage upper init |  | $\begin{array}{ll} \hline 11 / 2 \\ \hline \end{array}$ |  |  |
|  | V／4 | －Set ch | hange to ON／OFF co | ontrol from factory shipment in | itial setting． | 7 MODE key | $\checkmark$ MODE key | $\bigcirc$ mode key | $\bigcirc$ MODE key | $\bigcirc$ M MODE key |
| $\sqrt{1} \hat{U}$ | SET16：Timer 3 setting mode <br> V／A key | Operatio |  | $\Longrightarrow \underset{i}{\text { GEEDTH }}$ | Brill | 5．Setting of SV limiter lower limit Temperature Input：SV setting range lower limit to SLH Analogue Input：SV setting range lower 5.0 （5）limit to SLH－50 <br> $\checkmark$ MODE key |  $\Omega$ MODE key |  | $\square$ 56．Setting of dead band （Refer to Table 10．） <br> Th MODE key |  <br> $\checkmark$ MODE key |
|  | SET17：Communication setting mode | ＊ON／OFF <br> ＊Sensitivit | Press MODE key for 2 seconds control is set in E！II ty range is $1^{\circ} \mathrm{C}$ ，when ON | Change to＂SETA＂by $\Delta$ key Press $M$ Tilk 1 of factory shipment initial setting． NOFF control is set． | Change＂0＂to＂＂1＂by $\Delta$ key． seconds to back to operation Mode． |  |  |  |  | To 12 |
| $\underset{\text { To SET18 }}{\substack{n}}$ | V／ |  | ty range is $1^{\circ} \mathrm{C}$ ，when ON |  |  | $\int_{\text {To } 7}{ }^{7} \text { MODE Key }$ | $\begin{aligned} & \int_{\text {TO } 24} \text { mode key } \end{aligned}$ | $\underset{\text { To } 41}{\int_{1} \text { MODE key }}$ | $\int_{\text {To } 58}^{\sum_{\text {MODE Key }}}$ |  |




