3N0405-E

INSTRUCTIONS

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CHAPTER ONE- PREFACE

1、 SACURITY GUIDE

CAUTION

A、Independently and firmly ground wire. It is strictly prohibit connecting ground line to nil of power supply. It is also strictly prohibit sharing ground line with other electrical equipment.

B、It is strictly prohibit sharing power supply with other large power and start frequently equipment.

C、Protect the panel of the device from forcedly scraping or high temperature.

1. D、Not allow opening the cover of the device except by service person.

E、 must pull of the plug of Power Supply before open the cover of the device.

F、Firmly wire point of the ground line.

G、With continuous improvement, please read carefully the “Supplement and Description for New Function” if it is attached .

2、 SUMMARIZE

3N0405 controller used for belt scale and other weighing system. It is qualified with many kinds of mechanical conveyor. It has 3-channel analog input-outputs. It is easy to join the DCS (digit control system) and PLC control system.

PERFORMANCE

A、 IC chips in industry grade with high reliability.

B、CPLD programmable chips

C、Environment temperature: 0℃～45℃

D、 Measure precise: better than 0.05%.

E、Display / Keyboard: 8-digit+6-digit LED, 22 keys, 9 working status indicators.

F、 Able to control variety types of scales (belt, screw).

G、 Full isolation analog and switch input-output.

H、 Pulse input signal for speed.

I、 Exterior control including start, stop, computation permit and faulty aware.

J、 4～20mA Input for exterior define control target (Full isolation) .

K、 4～20mA Output for current flow (Full isolation) .

L、Pulse output for Sub-total (Full isolation).

M、Output contacts: Alarm, High limit, Low limit, Run, Ready.

N、 Switch inputs: Start (normally open), Stop (normally close), Computation permit (normally open) and Faulty aware (normally open).

O、 Print Report (Optional).

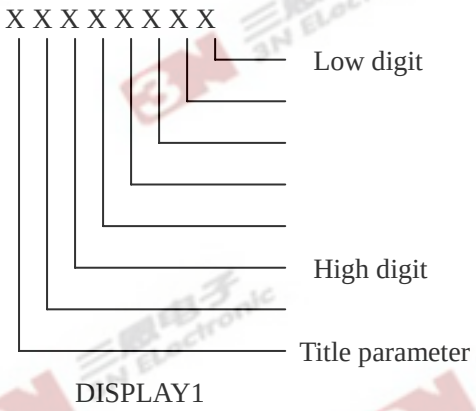
SPECIFICATIONS

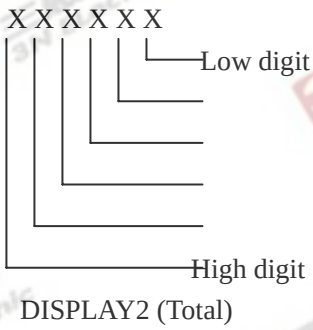
A、Power Supply: AC 220V +10%, 30W.
B、Feeding Control output: DC 0～5V.
C、Pre-feed Control output: DC 0～5V
D、Analog input for Loadcell: DC 0～5V。
E、Analog input for Exterior define control target (Full isolation): 4～20mA
F、Analog output for Current flow (Full isolation): 4～20mA
G、Pulse output for Sub-total (Full isolation): NPN、1Hz、200mS，DC24V、100mA
H、Output Contact: 36V,1A
I、 Pulse Input for Belt running speed: 0～2000Hz，NPN、DC12～18V。
J、 RS485 Communication Unit: Distance 1200m。
K、LED1 Display: Current Flow XXXXX.X Kg/Minute, Max 99999.9Kg。
L、LED2 Display: Total XXXXX.X ton, Max 99999.9

Chapter Two- Panel Description

1.Display

3N0405 has two group of LED Display Block, Display 1 is 8-digits and Display 2 is 6-digits. As below:





Display1:

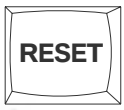
Usually display Current Flow.

When select parameter, the first and second digits display the title of parameter, Example of P1-P7, C0-C9 and A0-A9. From third to eighth displays the value of appointed parameter. The third digit is the highest digit of data.

Display2:

Display Accumulative Total (P2). The left digit is highest digit of the data. Add up do only IN CASE terminals 23 and 24 (terminal raft X3) are closed.

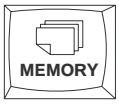
2. Keyboard



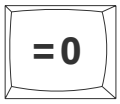
Reset: Whatever situation the system is, press this key result to the system get into initialization and display model of the device displays current flow.

Run/Stop: Start and stop the scale. Odd press start and even press stop.

It is available when Parameter C0=0 and it is not available when Parameter C0=1,or 2.

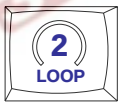


No use



Reset Total: When scale stop, get the parameter P2 by Px selection key, display: P2XXXXX.X, press this key, the total reset to zero, display P2 00000.0.

Cx、Ax and Ex Parameters select key: Circulate and display Cx, Ax and Ex parameters.

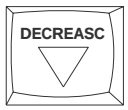


Px Parameters select key: Circulate and display Px parameters.

Back to previous parameter while checking parameters .

Move Cursor: Use in modifying parameters. The glittering digit indicate the position of the cursor, which means the digit is to be modified. Press this key to move the cursor.

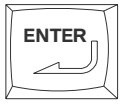
Increase: Press one time, the lowest digit of the selected parameter to add one. When the key be hold on, the second lowest digit of the selected parameter add one continuous.



Decrease: Press one time, the lowest digit of the selected parameter to subtract one. When the key be hold on, the second lowest digit of the selected parameter subtract one continuous.

Numeric key:

Input a new digit on the glittering position when modifying a parameter.



Confirm (CR): Inform the system parameter modifying finished and save the parameter.

3. 11 Indicators

a. POWER: Supply indicator, on when power on.

b. RUN: Running indicator, on when system is running.

c. ALARM: Alarm Indicator. On when alarm happening and off when alarm release.

d. MAX: Over High limit indicator, on when Current Flow over high limit (A2) and off when Flow normal.

e. >0<: Zero Procedure Indicator, on during Zero Procedure start and off when end.

f. MIN: Low limit indicator, on when Current Flow get lower than low limit (A3) and off when Flow normal.

g. RS485: Communication indicator, wink during communication and off when communication stop.

h. OUTSIDE: Remote Control Indicator, on when C0=1 Remote Command Way select meanwhile Keyboard Indicator off.

i. KEYBOARD: Panel Control Indicator, on when C0=0 Panel Command Way select meanwhile Outside Indicator off.

j. FUN2: Spare

k. FUN1: Spare

CHAPTER THREE- Parameters Description

3-1. MODIFY MOTHED FROM KEYBOARD

ALL Bellow parameters, what the input from keyboard means using this method edit parameter from keyboard

1. To locate PX ,HX parameters, press “LOOP2” continuously and check up the first two bits of Display 1, which indicate the title of the parameter.
   To locate CX ,AX, EX parameters, press “LOOP1” continuously and check up the first two bits of Display 1, which indicate the title of the parameter.
2. Using “INC” and “DEC”: Every time press one of these two keys, the lowest bit of selected parameter increase or decrease “1”. If hold down the key, the second lowest bit of selected parameter increase or decrease “1” rapidly.
3. Using “F2” to move cursor into the bit that need to be modified, and directly input the numeral keys.
4. check up the modified parameter and make sure it is correct. Press “Enter”(confirm) to inform system there is a update parameter so that the system will save it and make it effective. This is important. The update will be ignored without an “Enter” key-input following it. Don't forget it!!!

Px Parameter (Running data）

Using key “Loop 2” check up these parameters.

Using the combination of the keys “F2” and Numeral keys or the combination of the keys “INC” and “DEC” to input this parameter. The key “Enter” must be followed to confirm and inform system making new parameter effective. That is necessary and must not be forgotten. !!!!

P1: Control Target

Value: 0～99999.9 Kg / minute (C9=0)
0～99999.9 Ton / hour (C9=1)

This parameter is the goal that system control to reach. There are three ways to define the parameter.

1.Parameter C1 = 0 (keyboard),
Input from keyboard (reference to 3-1. MODIFY MOTHED FROM KEYBOARD)
2. Parameter C1 = 1 (remote terminal):
Analog input, Terminal X7(38 and 39), 4～20mA, corresponding Value range define by Parameter A0
3. Parameter C1 = 2 (Communication), Option

P2：Total:

Value: 0～99999.9 Ton

Performance:

Accumulative total materials go through the scale. It can be clear to zero and not able to modify.

Under the state of scale stop, select the parameter P2, Press “=0” can clear the total. The computation could be engaged only when terminal X3 (23 and 24) in close state (computation permit).

P3：Feeding output value:

Value: 0～1023。

This is value figure out by control program. Users can see it and know how the executive unit works.

Users can also set this value from keyboard to directly control the executive unit to work.

Setting this value when device stops, when it is started, the output will be regulated from the base of this value.

Setting this value when device start running, the output will be this value immediately.

Input from keyboard (reference to 3-1. MODIFY MOTHED FROM KEYBOARD)

P4：Zero Value

Value: 0～4095, general 600。

P4 is the reading of analog input when no materials on the belt. The reading can be seen on parameter An which belong to PX parameters. System has auto zero function and users also can set the zero value manually from keyboard in the way of modifying parameter.

If the device uses for constant-speed belt feeder, that is C6=0, zero process will be auto proceed before every time start running.

If the device uses for vary-speed belt feeder, that is C6=1, no zero process happened when starting. Users must select and begin a Zero Process when it is needed. Users also can define zero value self and input the value from keyboard.

The time of zero process lasting is determined by parameter A7, users define and input them from keyboard based. This defined time section A7 should make belt going a (or several) entire circle.

A. Auto Zero Process:

1. Press Run/Stop key to let the belt running so that the materials on the belt be clean up.
2. Press parameter select key (Loop-1) and select parameter A7. A7=Zero Process Time, which one means one second. Users define and input the Zero Process Time (A7) by measuring the interval of the belt going one or more than one circles.
3. Press Parameter Select Key (Loop-2) and select parameter P4. P4=Zero Value. Press Confirm Key (Enter) to command system to begin Zero Process. Zero Indicator on and digit LED1 displays value of the Loadcell analog input.

   When the Zero Process Time uses up, the process finish and the Zero Indicator off and new Zero Value save and become effective.

   Note: Must not touch the scale during the Zero Process.

B. Manual Modify Zero Value:

1. First do the step1 according the Auto Zero Process.
2. Press Parameter Select Key (loop 2) to select parameter P4. Input new Zero Value from keyboard. Press Confirm (Enter) to inform the system to accept the new value.

P5：Calibrate Factor:

Value: 0～9999.99

Calibrate Factor is a value that is needed to calculate the quantity of material passing through in a piece of time. This factor directly determines the precise. So it is strongly asked that Calibrate Factor must be carried out by Calibrate Process or by modifying parameter P5 from keyboard before the scale put in operation. And it is also strongly asked that Calibrate Process must be carried out after every time mechanical alteration happened.

1. Must do Zero Process before Calibrate Process (reference with Parameter P4).
2. Press Parameter Select Key (Loop-2) to select parameter P5. Original Calibrate Factor can be seen.
   Press Confirm Key (Enter), the process begin and display turn into 0000.00 (Kg) that means material add up in this calibrate process.
   If the controlled scale is Speed-Constant (C6=0), the belt or other running parts must be started running first.
3. Get a container under the discharge in order to collect the materials.
   Press Run/Stop and Running belt, and LED1 display accumulative material quantity through the weighing section.
   Manually adjust the execution unit (Frequency convert or control supply or something like) to drive material (or weights) passing the belt and go into the container.
4. Wait until the timer (A8) runs out, system automatically stops. If you feel got enough materials in the container, you can manually stop feeding by press key Run/Stop again. Add up stop also. However if the controlled object is a Speed-Constant belt scale (C6=0), must wait the belt clear up before you stop the running belt.
   By then system displays calculated quantity and RUN indicator off..
5. Weighing the all material collected by the container.
   If this weight is exactly equal to the value displayed by system, which means the old Calibrate Factor saved in system is all right. Just keep it and quit the Calibrate Process.
6. If this real weight in container different from the value displayed by system, it means the old Calibrate Factor need to be altered. Modify the displayed accumulated weight into real weight and press the Confirm Key (Enter). The system will calculate the new Calibrate Factor and display and save it. Do the Calibrate Process again using this new Calibrate Factor.

Note:

- Parameter C0 must be zero in order to do the Calibrate Process. C0=0 (Command on keyboard).
- Prohibit touching any part of the scale during the Calibrate Process.
- Zero Process must be done before Calibrate Process and suggest to do Calibrate Process more than one time to get high system precise.
- Before do Zero and Calibrate, It must be done to adjust the parallelism of the weighing rollers.

P6：P Value: Proportion factor in the PI-arithmetic

Value:

0～99.99, normally 1～60，default=10 .

Performance:

Users define this value from keyboard. It is P-factor of the PI-arithmetic, a model of software. P-factor is proportion factor and determines the change scope of output regarding to the gap between the target and real flow (you can see the output value in case of selecting P3). The larger this value is, the better following characteristic with Control Target. Unreasonable large of this P-factor will result to the over-regulation and the output oscillation. Contrariwise, too small P-factor will drag down the trace paces and make the system difficult to get up to the Control Target.

Input from keyboard (reference to 3-1. MODIFY MOTHED FROM KEYBOARD)

P7：T value: Integral factor in the PI-arithmetic

Value: 0-99.99, General 3～20, Default P7 = 5

Users define this value from keyboard. It is T-factor of the PI- arithmetic, a model of software. T-factor is integral factor and determines the change scope of output regarding to the gap between the real flow and last real flow (you can see the output value in case of selecting P3). The larger this value is, the better stability of system. Unreasonable small of this T-factor will result to the frequently-regulation and the output oscillation. Contrariwise, too large T-factor will drag down the trace paces and make the system difficult to get up to the Control Target.

Input from keyboard (reference to 3-1. MODIFY MOTHED FROM KEYBOARD)

Note:

- The purpose of iterative modifying the P and T value is to guarantee the smallest rebound of the real flow around the Control Target.
- If the fluctuating flow result from the mechanic problem, it is useless to modify the P and T factor.
- It must be done to re-define the P and T value in case the mechanical alter.
- P and T value is the key of the control precise. Make sure to determine the appropriate P and T.

P8： Flow Smooth Factor

Value: 0-100, Default P8 = 1

Users define this value from keyboard to restrain that displayed Flow fluctuate madly, only in case the mechanical incurable running unstable. The Bigger the value is the slower the display change.

The value does not affect any function but Flow display.

P9: Inner Accumulative Flow Error

Value: 0-9999.9, No Default set

This is system parameter and could not be modified by user. Sometimes, a large accumulative error occur inner system because of mechanical faulty which make materials block or collapse. So the real accumulative production will get far away from goal production. If Users set the parameter CC=1 and start flow trace function, P9 will display the accumulative error of production. As soon as the mechanical running stable and normal, system will adjust control pace and this error display will turn to be zero.

If set CC=0, this P9 always be 0.

AN：Analog Input of Loadcell:

Value: 0～4095。
The value comes from the A/D module that convert the signal from Loadcell into digits.
Be not modifiable.

FP：Speed

Value: 0～2000Hz
The value comes from the speed sensor. The great the value is means the faster the belt is running.
Be not modifiable.

Print： Optional

t1：Date

Display Format： Year, Month, Date (XX.XX.XX)
Input from keyboard (reference to 3-1. MODIFY MOTHED FROM KEYBOARD)

t2：Clock

Display Format：Hour, Minute, Second (XX.XX.XX)
Using the combination of the keys “F2” and Numeral to input real time. Must Confirm it and inform system using the key “Enter” after ending the modify process.

DA：Date of Last Turn On

Display Format： Year, Month, Date (XX.XX.XX)

TA：Time of Last Turn On

Display Format：Hour, Minute, Second (XX.XX.XX)

DE：Date of Last Turn Off

Display Format： Year, Month, Date (XX.XX.XX)

TE：Time of Last Turn Off

Display Format：Hour, Minute, Second (XX.XX.XX)

Hx Group of Parameters (Pre-Feeding Function)

Hx group of Parameters are for Pre-Feeding function that is optional function and must set C7=1.

The function of Pre-Feeding is to control the thickness or quantity of materials on the weighing section of the belt and make it closely constant.
Using the combination of the keys “F2” and Numeral keys or the combination of the keys “INC” and “DEC” to input this parameter. The key “Enter” must be followed to confirm and inform system making new parameter effective. That is necessary and must not be forgotten. !!!!

H0：Load of the Weighing Section

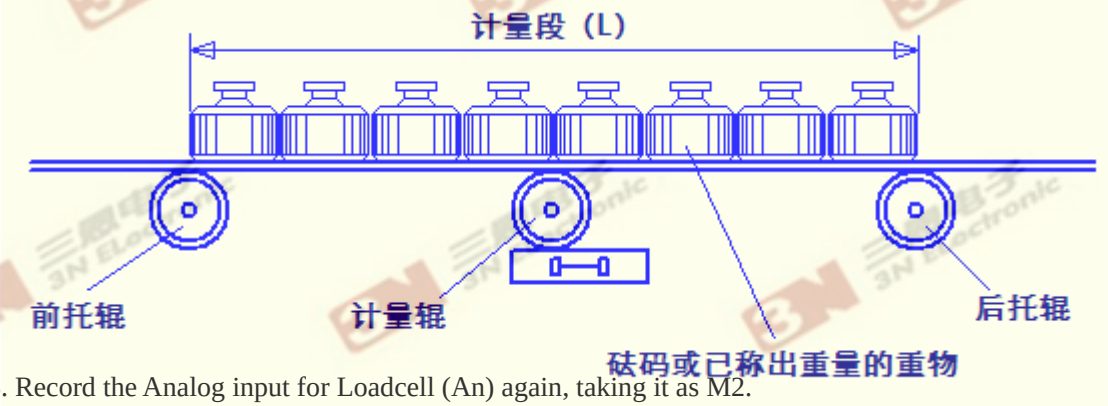
Value: 0～9999.99Kg
Real Load of the weighing section
Not modifiable.

H1：Goal of Load of Belt

Value: 0～9999.99Kg
This is the goal of Load that is considered to be proper. Larger value means the thicker of materials.
Input from keyboard (reference to 3-1. MODIFY MOTHED FROM KEYBOARD)

H2：Proportion Between Analog Input for Loadcell and Belt Load

Value: 1～9999.99
Performance:
This Value is determined only through a manual calibration process.
1. Zero Process (define P4) and Calibrate Process (define P5) must be done.
2. Clear up the belt especially the weighing section..
3. Record the Analog Input for Loadcell (An), taking it as M1
4. Put standard weights on the weighing section, along with the central line of the weighing section. It is best putting the weights well-proportioned from the first roller of the section to the last roller of the section.



5. Record the Analog input for Loadcell (An) again, taking it as M2.
6. According the formula: H2=(M2-M1) / total of weight. The unit of weight is Kg.
Input H2 from keyboard (reference to 3-1. MODIFY MOTHED FROM KEYBOARD)

H3: Output of Pre-Feeding

Value: 0～1023。

This value is calculated by control program. Users can see it and know how the executive unit for pre-feeding works. Users can set this value from keyboard to directly control the executive unit to work.

Setting this value when device stops, when it is started, the output will be regulated from this value.

Input from keyboard (reference to 3-1. MODIFY MOTHED FROM KEYBOARD)

HP: P-Factor in PI Module for Pre-Feeding

Value: 0-99.99, General 1-60, Default : HP=10 Same meaning with Parameter P6.

HT: T-Factor in PI Module for Pre-Feeding

Value: 0-99.99, General 3-20, Default HT=5 Same meaning with Parameter P7.

About Pre-Feeding:

1. Pre-Feeding is an optional control loop. It is to guarantee well-proportioned materials on the belt. Its calibrated-factor (H2) adopts static measurement and do not need do often.

2. Goal of Pre-Feeding (H1) do not need to alter often, even though the Control Target (P2) alters.

3. Define Process of H1:

a. Determine the value of (H2), reference to the Parameter H2 instruction.

b. Open inlet gate in a proper position, manual drive belt running to make the materials to be dragged out to the discharge end. Ensure the shape of materials on the belt to look ideal and no spillover from edge of belt.

c. Watch the value of load of weighing section (H0). This value can be taken as a ideal goal (H1).

d. Too large H1 makes materials pileup on the inlet and too small H1 makes thinner material layer resulting the speed up running and discharge sloop air-leak (too less material).

e. Parameter C7 must set be “1”, C7=1

Cx Group of Parameters (System Parameter)

Using key "Loop 1" check up these parameters. Keeping hitting "Loop 1" makes all Cx and Ax group of parameters revolved display.

Set these parameters from keyboard.

Using the combination of the keys "F2" and Numeral keys or the combination of the keys "INC" and "DEC" to input this parameter. The key "Enter" must be followed to confirm and inform system making new parameter effective. That is necessary and must not be forgotten. !!!!

C0: Run/Stop Command Way

value: C0: 0=Panel, 1=Remote terminal 2=Remote communication

Performance:

1. C0=0, run and stop the system by pressing the key (Run/Stop) on panel.
2. C0=1, Run and Stop operation controlled by terminals raft X3 (see back of the device). Terminals 19 and 20 (normally open) are for running, and terminals 21 and 22 (normally close) for stopping. To run the system, stop terminals must be closed.
3. C0=2, Run and Stop operation controlled by communication with central control room. Need to know the main control system of the main service station. It is must done that local device address (C8) is set first.

C1: Target (P1) Define Way

Value: 0=Panel, 1=analog input, 2=Remote Communication

1. C1=0, Parameter (P1) input from keyboard, Reference Parameter P1
2. C1=1, Parameter (P1) is determined by analog input, terminal raft X7, terminals 38 and 39, signal 4-20mA.
3. C1=2, Parameter (P1) is determined by communication with central control room. Need to know the main control system of the main service station. It is must done that local device address (C8) set.

C2: Remote Analog output Select (terminals 40 and 41)

Value: Always = 0

C3: Alarm Limit Condition

C3=0: Parameter A2 and A3 show as percentage, Unit %

C3=1: Parameter A2 and A3 show as a real value with same unit as Control Target (P1).

Refer to parameter A2 and A3

C4: Stop with Alarm

C4=0: Non stop in case alarm occur. System still running and output alarm signal.

C4=1: In case of an alarm happen, system insists on running a section of time that depend the value of A4 and then stop.

C5: Add up Way

C5=0: Do Accumulative Total (P2) all time no matter system running or not. It is considerable while users manual drive feeding sometime

C5=1: Do Accumulative Total (P2) only when system is running.

C6: Set Controlled Scale

C6=0: Controlled object is Speed-Constant Belt Scale. No speed signal. Controlled executor is feeding unit. Zero Process is automatically engaged before it is to run. Refer to P4

C6=1: Controlled object is Speed-Vary Belt Scale with speed signal. Controlled executor is Frequency Inverter .

C7: Control Way

C7=0: Control the flow of scale.

C7=1: Control the flow of scale with Pre-Feeding function.

C7=2: Only Weighing and do add up (not in this device)

C8：Local Station Address

00～32, use for communication。Not allow more than one has same address. If do not communication, C8=0

C9：Flow Unit Select

C9=0: Flow and related values (P1,A0,A1 also A2,A3 when C3=1) Show as Kg/minute .

C9=1: Flow and related values (P1,A0,A1 also A2,A3 when C3=1) Show as Ton/Hour.

CC：Flow Trace

CC=0: Not flow trace performance.

CC=1: Start the flow trace performance. That is, during a section of time, if accumulative flow largely less than expected flow, which usually occur when materials block, the system will automatically make up the flow. Otherwise, if the accumulative flow largely more than expected one, which usually occur when materials collapse, the system will automatically decrease the flow.

In normal case, set CC=0, do not start this function

AX Parameters

Like Cx group of parameters, using key “Loop 1” check up these parameters. Keeping hitting “Loop 1” makes all Cx and Ax group of parameters revolved display.

Set these parameters from keyboard.

Using the combination of the keys “F2” and Numeral keys or the combination of the keys “INC” and “DEC” to input this parameter. The key “Enter” must be followed to confirm and inform system making new parameter effective. That is necessary and must not be forgotten. !!!!

A0: Maximum of Control Target (P1)

Value: 1.00～9999.99 Kg / Minute (when C9=0)
1.00～9999.99 Ton / Hour (when C9=1)

This value is effective only when C1=1, that is Control Target P1 determined by remote analog input come from remote center or somewhere like.

The signal gets in through terminals raft X7 (38 and 39), 0-20mA.

That means, the Control Target (P1) = A0 when the signal is 20mA.

For example: If A0=500 Kg / Minute, then P1= (signal-4)*500 /(20-4) while signal vary in range of 4-20.

A1: Maximum of Current Flow output

Value: 1.00～9999.99 Kg / Minute (when C9=0)
1.00～9999.99 Ton / Hour (when C9=1)

A analog output sends a variable signal to remote control center (or somewhere like) through terminals raft X7 (40 and 41). Signal 4-20mA.

This A1 defines actually that how much the Current Flow is when the signal should be 20mA.

For example: If A1=500 Kg / Minute,
Then, Signal = (Flow* (20-4) / 500) +4 while Current Flow vary in a range of 0-500.Kg

A2: High Limit for Current Flow

Value: 1.00～9999.99 Kg / Minute (when C9=0,C3=1)
1.00～9999.99 Ton / Hour (when C9=1, C3=1)
1.00～99.99 % (when C9=0 or 1,C3=0)

1. When parameter C3=0, A2 presents a percent of the Control Target P1. Default is 20.
   If Flow > P1+A2*P1 then system gives an alarm.
2. When parameter C3=1, A2 presents a Kg per minute, or ton per hour (the unit same as P1). A2 is not allowed to be less than P1.
   If Flow > A2 then system gives an alarm. The Alarm indicator and MAX indicator on and alarm switch-output sent out through terminals raft X1 (1,2,3,7,8,9).

A3: Low Limit for Current Flow

Value: 1.00～9999.99 Kg / Minute (when C9=0,C3=1)
1.00～9999.99 Ton / Hour (when C9=1, C3=1)
1.00～99.99 % (when C9=0 or 1,C3=0)

1. When parameter C3=0, A3 presents a percent of the Control Target P1. Default is 20.
   If Flow < P1-A3*P1 then system gives an alarm.
2. When parameter C3=1, A3 presents a Kg per minute, or ton per hour (the unit same as P1). A3 is not allowed to be larger than P1.
   If Flow < A3 then system gives a alarm. The ALARM indicator and MIN indicator on and alarm switch-output sent out through terminals raft X1 (1,2,3,4,5,6).

A4: Delay for Stop resulting from Alarm

Value: 0～9999 (second)

While C4=1 (system will stop with alarm), A4 means the time section that system can tolerance running in the alarm condition. If continuous alarm time over the time section A4 then system will automatically stop.

A5: Max. Fluctuate of belt fluctuate

Value: 0～4095。

1. Zero Value (P4) is constant figured out by average of a series analog input with empty running belt. However, the analog input (An) of load cell in running status is a variable even though no materials on the belt because of the mechanical structure not absolutely balance. When input An > Zero P4, small Current Flow will come out and wrong add up happen (even no materials actually on belt).
2. A5 set a limit. If the input An < A5, it will not effect the Flow and Add up.
3. Keep belt running and ensure no materials on belt, watch out the analog input An and set A5 as more than the biggest reading (An). For example: the biggest An is 350, A5 can be 355 or 360. Must larger than it but must not larger too much, must be far less than the analog input An occurred when any little materials on the belt.

A6: Subtotal Pulse Output

Value: 1～9999.99 kg

The system send a pulse output to inform the remote a subtotal reached through terminals raft X9 (50 and 51), NPN no power output. The frequency of pulse is not higher than 1 Hz. For example, A6=2000Kg, one pulse send out for every 2000Kg.

A7: Time Section of Zero Procedure

Value: 0～9999 秒。

A7 determines how long Zero Procedure last.

Make a mark on the belt. Drive the belt running and take down the exactly interval T which belt running a entire circle need. Set A7 to be n times of the interval T (n=1 to 3)

A8: Feeding time of Calibrate Procedure

Value: 0～9999 秒。

During the Calibrate Procedure, After pressing key “RUN/STOP” and feeding materials through the belt, system will automatically stop the feeding at the moment the time A8 run out.

If wanting to stop feeding before the time run out, press key “RUN/STOP” again to force the system stop

A9: Password

Value: 000000-999999, 6 digits

Input a new 6-digits Password. You can do this only in case there is a cursor flash, means you have a privilege of modifying parameters.

Just orderly input 6 digits one by one. System will automatically save and renew the password.

When the device delivery, the password is ‘123456’

Note: Every time reset the system or power on, system will display “= = = = = =” for 10 seconds to wait input the password.

6-digits password orderly input one by one. System will not display anything.

If the password is right, you get privilege of changing all parameters (a cursor flash, include A9 itself) and dong Zero and Calibrate Procedure.

Otherwise, if the password is not right or if input nothing during the 10 second, you only can modify some few of parameters including P1, P3, P6, P7, A5, C0, C1.

If begin inputting passwords but less than 6 digits, system will wait.

AA： Adjust Scale of flow trace

Value: 0-99, Unit %, Default =10 (10%)

When CC=1, system start flow trace module. The parameter AA determines the control pace of flow trace. That means how fast system will eliminate the accumulative error. It is normally set to be 10. Too big value will cause the system unstable.

At：Delay of Run /Stop Command

Value: 0-999, Unit: second, Default =10 (10s)

Setting way: Input on keyboard

At=0: No delay.

At=XX: When system receive the run or stop command (from keyboard or from outside switch), it will wait XX seconds before it really acts.

AL：Delay from Start to Feed Materials (for Speed Constant Feeder)

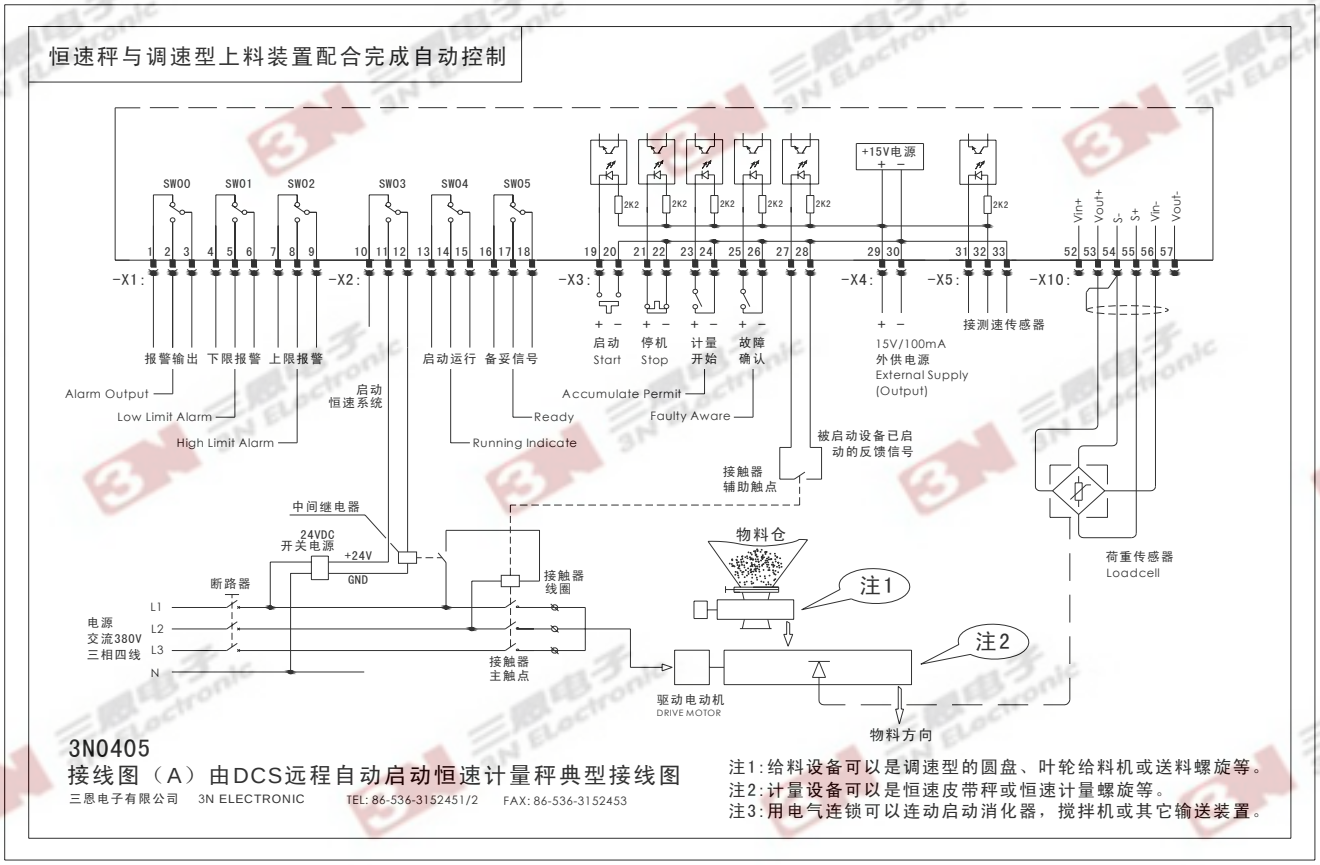
0 - 9999 Second

When feeder receive a start command (from both keyboard and remote):

1. Start the belt, output signal terminal X2, Swo3= On
2. If belt fail to run within 2 seconds, send alarm. The alarm signal will desppear when next start/stop command receive.
3. If belt start running, let belt run a duration decided by this parameter AL.
4. Then do zero procedure and really start feeding materials.

When feeder receive a stop command (from both keyboard and remote):

1. Stop feeding materials first.
2. Let belt continue running a duration decided by AL to clear belt.
3. Stop belt. Swo3=off



E0 (E1): EXTERNAL GOAL INPUT MINIMUM (MAXIMUM) ADJUSTER

When parameter C1=1, the control goal determined by external analog input (Input channel 1). The signal should be 4-20mA and converted digit value should be 0-4095. However, in practical circuit the actually signal probably is between 0-22mA (or 6-18mA something like) and not able to guarantee to convert into digit value 0-4095. Setting Parameter E0 and E1 can solve the problem.

Determine E0:

1. Set C1=1 and E0=0
2. Make the input signal minimum and check up the P1 (Control Target) that should be zero.
3. If P1 > 0 then increase the E0 and check the P1 again.
4. Repeat the step 3 till the P1 exactly equal to 0.

Determine E1:

1. Set C1=1 and E1=4095, then decide and input Parameter A0 (for instance A0=500)
2. Make the input signal maximum and check up the P1 (Control Target) that should equal to A0.
3. If P1 < A0 then decrease the E1 and check the P1 again.
4. Repeat the step 3 till the P1 exactly equal to A0.

E2 (E3): FLOW OUTPUT MINIMUM (MAXINUM) ADJUSTER

E2 and E3 are set for solving Same problem as above with Flow Output (output channel 1) to guarantee the digit 0-1023 convert into exactly 4-20mA.

Determine E2:

1. Set E2=0
2. Simulate input the loadcell and speed signal being minimum and the Current Flow should be zero (0000.00).
3. Check up output (Output Channel 1) that should be 4mA. If it < 4mA then increase the E2, otherwise decrease E2.
4. Repeat the step 3 till the output exactly equal to 4mA.

Determine E3:

1. Set E3=1023, and then decide and input Parameter A1 (for instance A1=500), and set P4=0 (zero value=0)
2. Simulate input the loadcell and speed signal making Current Flow equal to or greater than A1 (500.00in this case).
3. Check up output (Channel 1) that should be 20mA. If it > 20mA then decrease the E3, otherwise increase E3.
4. Repeat the step 3 till the output exactly equal to 20mA.

E 6 （E 7 ）：CONTROL OUTPUT MINIMUM (MAXIMUM) LIMITATION

Value: 0-1023

These two parameters limit the range of controlling output and ensure system working in an excellent state. When system running in a good condition, watch parameter P3 (Output value, press Loop2), take down a group of P3 value. E6 could be the smallest one or less than it. E7 could be the biggest one or large than it.

E8: Multiple of Calibration P5

0～4，Default=0, set only by device service personal.

Calibration coefficient is so important to measure that it is too big or too small will make against measure precise. The combination of E8 and P5 will abtain a proper real calibration in system.

E8=0, Calibration coefficient =P5

E8=1, Calibration coefficient =P5 * 2

E8=2, Calibration coefficient =P5 * 4

E8=3, Calibration coefficient =P5 * 8

E8=4, Calibration coefficient =P5 * 16

E9: Baud Rate

Select proper baud to be consistent with other devices that communicate with.

E9=0: Baud=2400

E9=1: Baud=4800

E9=2: Baud=9600

E9=3: Baud=19200

O Group Parameters

O0：Flow Subsection Adjust Function Active/Cancel

When belt runs as a various speed, calculated flow come from same load on belt will show somehow differences. Flow subsection adjust function build for resolve this problem.

O0=0: Cancel this function.

O0=1: Active this function. Parameters O1-O4 must be set properly before active this function. All these four parameters limit within 0.9-1.1.

O1: Coefficient 1 of Flow Subsection Adjust

Adjust proportion when flow is less than 25% of maximum flow (A1). Default=0.9

O2: Coefficient 1 of Flow Subsection Adjust

Adjust proportion when flow is around 25% of maximum flow (A1). Default=0.95

O3: Coefficient 1 of Flow Subsection Adjust

Adjust proportion when flow is around 75% of maximum flow (A1). Default=1.05

O4: Coefficient 1 of Flow Subsection Adjust

Adjust proportion when flow is around maximum flow (A1). Default=1.1

O5 - O9：Auto Print

There could have 4 times auto print every day. Total will be clear after every auto print action.

O5=0: No auto print

O5=1: Start auto print.

O6-O9 parameters appoint the hour moment of four time print acts

If less than 4 times auto print need, set same hour setting as previous one that is needed.

For instance: Print one time every day at 8 o’clock

O5=1, O6=8, O7=8, O8=8, O9=8

Print two times every day respectively at 0:00 and 12:00

O5=1, O6=0, O7=12, O8=12, O9=12

Print three times every day respectively at 0:00 and 8:00 and 16:00

O5=1, O6=0, O7=8, O8=16, O9=16

Print four times every day respectively at 2:00 and 8:00 and 12:00 and 20:00

O5=1, O6=2, O7=8, O8=14, O9=20

CHAPTER FOUR- Basic Operate

1. Switch on

Switch on the device and see the display of “3N0405-E (Y or others). Wait a while for initialization and then system displays 6 digits “=” for waiting the password input to decide whether give an edit permission.
When the device delivery, the password is ‘123456’
Note: Every time reset the system or power on, system will display “= = = = = =” for 10 seconds to wait input the password. 6 digits password orderly input one by one. System will not display anything.
If the password is right, You get privilege of modifying all parameters (include Password-A9 itself) and doing Zero and Calibrate Process.
Otherwise, if the password is not right or if do nothing during the 10 second, you only can change some few of parameters including P1, P3, P6, P7, P8, A5, C0, C1.
If begin inputting passwords but less than 6 digits, system will wait.
By then the Current Flow displayed on display1 and Accumulative Total displayed on display2. By now users can select to see or modify Px or Ax or Cx group of Parameters from panel.

2. Type of Feeder

If the controlled object is Speed-Constant scale, set C6=0, Zero Process is automatically carried out first when start to run. The time section that Zero Process last is determined by Parameter A7
If the controlled object is Speed-Vary scale, setC6=1, It can be start running without a Zero Process.

3. Key “LOOP2”

Watch and modify Px group of parameters using key “LOOP2”. Anytime.

4. Key “LOOP1”

Watch and modify Ax or Cx ,Ex group of parameters using key “LOOP1”. Available only while system stopping.

5. Edit Parameter

Using keys “INC” and “DEC”: one time press the two keys the data increase or decrease “1” in the lowest digit.
Hold on one of the two keys the data increase or decrease “1” in the second lowest digit rapidly.
Using numeral keys: move the cursor (with key “F2”) to the digit needed to alter and then input the numeral keys (0-9), the digit on which cursor wink is altered.
Using the combination of the keys “F2” and Numeral keys or the combination of the keys “INC” and “DEC” to input this parameter. The key “Enter” must be followed to confirm and inform system making new parameter effective. That is necessary and must not be forgotten. !!!!

6. Quit From Editing Parameters

Pressing key “LOOP1” can quit the edit status that “LOOP2” initiate and pressing “LOOP2” can quit the edit status that “LOOP1”initiate. System normally displays Current Flow while in neither “LOOP1” nor “LOOP2” edit status.

7. Clear Accumulative Total

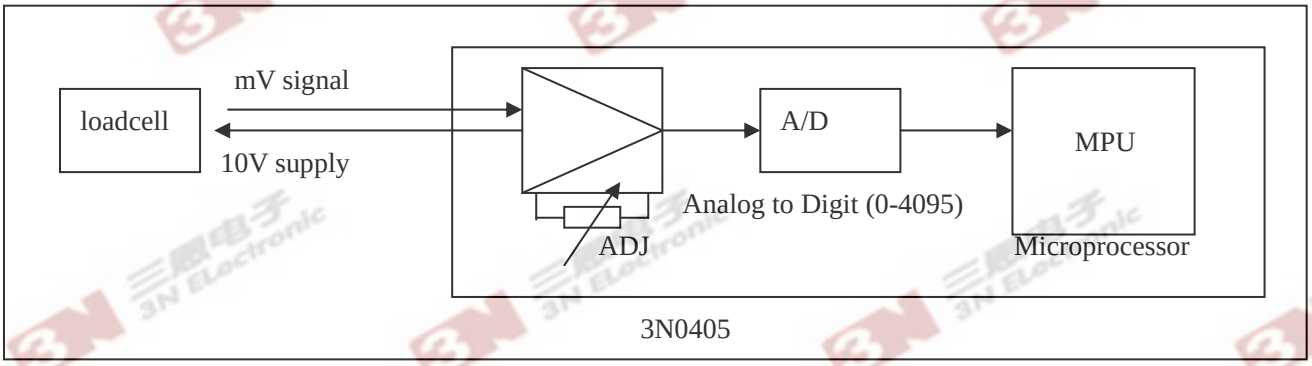
Using key “LOOP2” select parameter P2 and Press key “=0” to clear up the Accumulative Total (add up) and make P2=0. It is allow to be done only in stop status.

8. Before Calibration

Before do Calibration Process, must make sure C0=0 (panel command way).

CHAPTER FIVE - ADJUST AMPLIFIER OF LOADCELL

This signal is amplified into 0-5V and then converted into digit 0-4095.
Amplifier in the device that amplifies the signal into 0-5V is designed to be multiple adjustable so that it can be suitable for diverse loadcell.
The device offers10V supply to loadcell.
Maximal signal accepted by the device must be between 0-62.5mV.



The adjustment must be done first to make the device can work with different kinds of loadcell.

5-1. Range of analog

Signal from loadcell finally comes to a digit 0-4095 into MPU. However, in actually, the best range of normally materials result to should be 15-90%, that is 614-3685.
Section 0-614 and section 3685-4095 use for tackling abnormality change of material.
Over the range of 0-4095, controller will fail to calculate.

5-2. Resolution

The resolution for the controller is: 3685-614=3071

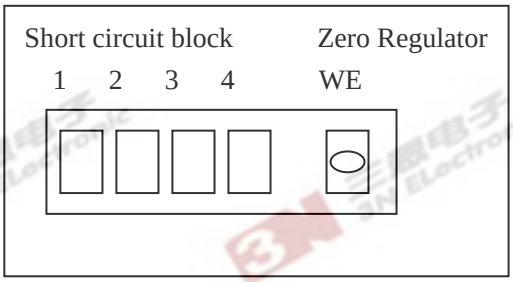
5-3. Method of adjusting amplifier:

Adjusting the amplifier make sure the convert digit to vary in this reasonable range.

Face to the back of the device, right of the terminals X10, there is a adjust window.

There two parts in the window. The Left one is four-set of shortcut block. The four sets block are titled “1,2,3,4”.

Keep or remove the blocks change the multiple of amplifier.



5-4. Calculate multiple of amplifier

The four sets block are titled “1,2,3,4”, from left to right.

5-4-1.Assume:

Assume the state=0 while keep the block on it

And state=1 while remove the block from it

The multiple K = 80+state (1)*80+state (2)*160+state (3)*320+state (4)*640

5-4-2. Table:

“1”	“2”	“3”	“4”	F (multiple)
0	0	0	0	80
1	0	0	0	160
0	1	0	0	240
1	1	0	0	320
0	0	1	0	400
1	0	1	0	480
0	1	1	0	560
1	1	1	0	640
0	0	0	1	720
1	0	0	1	800
0	1	0	1	880
1	1	0	1	960
0	0	1	1	1040
1	0	1	1	1120
0	1	1	1	1200
1	1	1	1	1280

5-5. How to determine the multiple of amplifier F before the device put in use.

Function of adjusting amplifier make it to be convenient to connect varies kind of loadcell. In principle, we suggest users to use larger scope sensor. It is not only to prevent loadcell from damaging but also to avoid to preparing too many type loadcell.

5-5-1 Calculate the multiple F

Assume: $A = \frac{5\ V}{4096} = 1.221mV / digit$

And Assume: C= signal (mV) from loadcell while maximum load including maximum material and mechanical weight.

And know : 4096*10%=3685 (efficiently range)

D=3685*A= 3685*1.221mV = 4499.38mV

Then, Fk=D / C =(4499.38mV) / C

Then, Fk=(4499mV) / C

For example, the signal from loadcell when maximal materials Load on belt is 50mV, that is C=50mV

Then $Fk = \frac{4499}{50} = 89.98$,

check up the table, select the F=80, that is keep all shortcut block on their position.

If the calculated Fk is between two values listed in table, we suggest choose the smaller one.

Adjust WE make the “An” to be 614 about.

5-5-2. Determinate multiple F by means of Measure

Assume F as multiple (general 120-280) and settle the state of blocks.

Connect loadcell to controller and power on..

Check up "An" and take record as An1.

Put a 5Kg (2-10Kg) weight on the weighing point and record the weight as GL, reading of "An" as An2.

Calculate: $G = \frac{An2 - An1}{GL}$; keep one bit decimal.

G means digit Analog /per kilogram of weight.

And Assume: C= signal (mV) from loadcell while maximum load including maximum material and mechanical weight.

Then, DG=C*G. Maximal digit analog result from maximal load with assumed multiple F.

Because of $\frac{F}{Fk}$ should be equal to $\frac{3071}{DG}$

Then $Fk = \frac{3071 * F}{DG}$, (Fk: is the multiple)

Check up the table, select the closest F and settle down the blocks according to new F.

If the calculated Fk is between two values listed in table, we suggest choose the smaller one.

5-5-3. Determinate multiple F by means of experiment

Assume F as multiple (general 120-280) and settle the state of blocks.

Connect loadcell to controller and power on..

Adjust resistant WE to make the "An" reading be 614 about (refer to 2-6).

Load maximal weight (equivalent with maximal material flow) on weighing section. Check up "An", the reading should be 3685 about. If it not, alter multiple of amplifier by changing the block set state till it is.

Take out the weight and make sure to clear belt, check up "An" again. The reading should be 614 about. If it not, adjust WE till it is.

Repeat do the process till those "An" reading both fall in required range.

5-5-4. Determinate multiple F by means of defining weight resolution

Select a proper weight resolution F, that means increase of An per one Kg load on weighing section.

For example: put 1 Kg weight on weighing section, increase of An is 10.

Then, F = 1Kg /10 =0.1

It means computer can aware when 0.1 Kg load on belt.

The smaller F, the higher precise and the smaller of max load. So select F properly.

Assume F , for example F=0.1

$$H = \frac{\text{Max. Load (Kg)}}{F}$$

H should be less than 3071, if it not, increase F till it is.

Connect loadcell to controller and power on

Adjust WE make the “An” to be 614 about.

Put a 1Kg weight on belt of weighing section, check increase of “An”. The increase should be accordant with F. If it is not, change short circuit block to make it is.

Adjust WE make the “An” to be 614 about.

5-6. How to Adjust WE- zero point of amplifier

There two parts in the window. Next to shortcut block for multiple F, The right part is a adjustable resistance WE, use for adjust zero point of amplifier. Keep no any materials on the belt and check up the An (press key “Loop 2”, till display “An”), adjusting Wz makes the An is about 614.

5-7. Summarize

Suggest using method 3(5-5-3) or 4(5-5-4).

3685 is an up limit. Don’t need to exactly equal to this number. Must not over this number.

The key of these methods is satisfied with the weighing precise.

Appendix 1 - Parameter List-1

Para	Description	Format	Value	Unit	Modify	Default	Mark
P1	Control Target	XXXX.XX	0.0～9999.99	Kg/Minute	All time	—	
P2	Total	XXXXX.X	0.0～9999.9	ton	N	—	Can Clear
P3	Control Output	X X X X	0～1023	— —	All time	—	Auto
P4	Zero Value	X X X X	0～4095	— —	Password	—	Zero
P5	Calibrate Factor-K	XXXX.XX	1.0～9999.99	— —	Password	—	Calibrate
P6	P Factor	X X . X X	0～99.99	— —	All time	10.00	PI Factor
P7	T Factor	X X . X X	0～99.99	— —	All time	5.00	PI Factor
P8	Flow Smooth	X X X	0-100	— —	All time	—	Smooth
An	Analogof Loadcell	X X X X	0～4095	— —	N	—	Loadcell
FP	Speed Frequency	X X X X	0～2000	— —	N	—	Speed
t1	Date	XX.XX.XX	99.12.31	Y.M.D	Password	—	Keyboard
t2	Time	XX.XX.XX	24.59.59	H, M, S	Password	—	Keyboard
DA	Date of last turn on	XX.XX.XX	99.12.31	Y.M.D	N	—	Display
DE	Time of last trun on	XX.XX.XX	24.59.59	H, M, S	N	—	Display
TA	Date of last turn on	XX.XX.XX	99.12.31	Y.M.D	N	—	Display
TE	Time of last trun on	XX.XX.XX	24.59.59	H, M, S	N	—	Display
H0	Current Loading	XXXX.XX	0.0～9999.99	Kg	N	—	
H1	Control Target	XXXX.XX	0.0～9999.9	Kg	Password	—	
H2	Calibrated K	XXXX	0～1023	— —	Password	—	
H3	Control output	XXX	0～1023	— —	Password	—	
Hp	P Factor	XX.XX	1.0～99.99	— —	Password	5.00	PI Factor
Ht	T Factor	XX.XX	1.0～99.99	— —	Password	10.00	PI Factor

Appendix 2 - Cx Group of Parameters

Para	Description	Format	Value	Unit	Modify	Default	Mark
C0	Command Way	X	0：Keyboard 1：Exterior Switch Input 2：Communication	— —	Stop	0	
C1	Target Define	X	0：Keyboard Input 1：Exterior analog Input 2：Communication	— —	Stop	0	
C2	Remote Analog Output	X	0：Current Flow 1：Load on Belt 2：Speed of Belt	— —	Stop & password	0	
C3	Alarm Condition	X	0：Percent 1：Real Flow	— —	Stop & password	0	
C4	Stop In case Alarm	X	0：No 1：Yes, After Delay	— —	Stop & password	0	
C5	Add Up During stop	X	0：No 1：Yes	— —	Stop & password	0	
C6	Type of Scale	X	0：Speed-Constant 1：Speed-Vary	— —	Stop & password	—	
C7	Control Way	X	0：Control Feed 1：Control with Pre-Feed 2：Only Measure Weight	— —	Stop & password	0	
C8	Communication Address		00：No communication 01～32:	— —	Stop & password	00	
C9	Display Way	X	0: Kg / Minute 1: Ton / Hour	— —	Stop & passw.	00	
CC	Trace Select	X	0=No Trace 1=Start Trace		password	0	

Appendix 3 - Ax Group of Parameters

Para	Description	Format	Value	Unit	Modify	Default	Mark
A0	Max. Target Input	XXXX.XX	1.0～9999.99	Kg/Minute	Stop & passw.	500	
A1	Max. Flow out.	XXXX.XX	1.0～9999.99	Kg/Minute	Stop & passw..	500	
A2	High Limit	XXXX.XX	1.0～9999.99	% Or Kg/Minute	Stop & passw.	20	Refer to C3
A3	Low Limit	XXXX.XX	1.0～9999.99	%or Kg/Min	Stop & passw..	20	Refer to C3
A4	Delay For Stop	XXXX	0～9999	Second	Stop & passw.	60	Refer to C4
A5	Max. fluctuate	XXXX	2～9999	——	Stop	—	Refer to P4
A6	Sub-total Pulse	XXXX	1～9999.99	Kg	Stop & passw.	1000	NPN
A7	Zero Process Time	XXXX	0～9999	Second	Stop & passw.	10	
A8	Calibrate Time	XXXX	0～9999	Second	Stop & Passw.	10	
A9	Password	XXXXXX	0～999999		Stop & passw..	123456	
AA	Pace of Flow Trace	XX	0～99	%	Stop & passw..	10	
At	Delay of Run/Stop	XX	0～99	Second	Stop & passw.	0	
AL	Delay for Feeding	XXXX	0～999	Second	Stop & passw	10	

Appendix 4 - Ex Group of Parameters

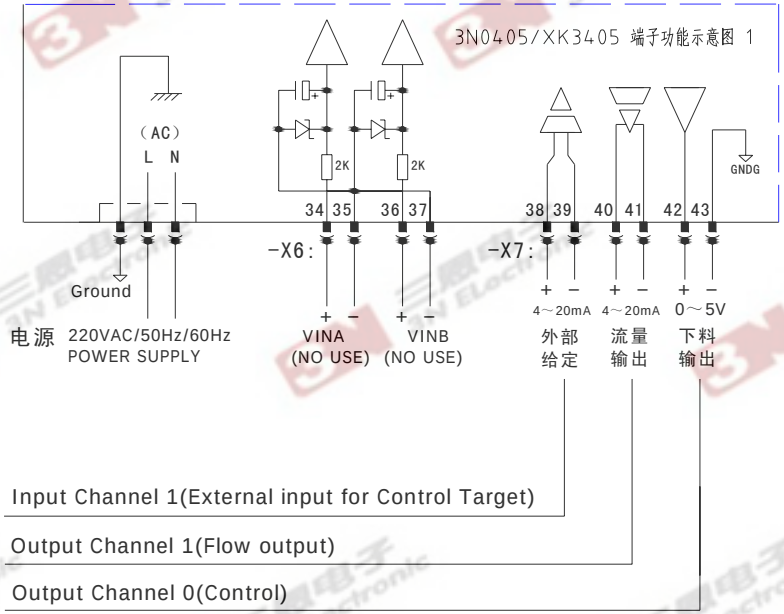
Para	Description	Format	Value	Unit	Modify	Default	Mark
E0 (E1)	Target Input Adjust	XXXX	0～4096	——	Stop & passw.	0	
E2 (E3)	Flow Output Adjust	XXXX	0～1023	——	Stop & passw.	0	
E6 (E7)	Control Output Limit	XXXX	0～1023	——	Stop & passw.	0	
E8	Multiple of Calibration	X	0-4		Y	0	
E9	Communication Baud	X	0-3		Y	3	

Appendix 5 - Ox Group of Parameters

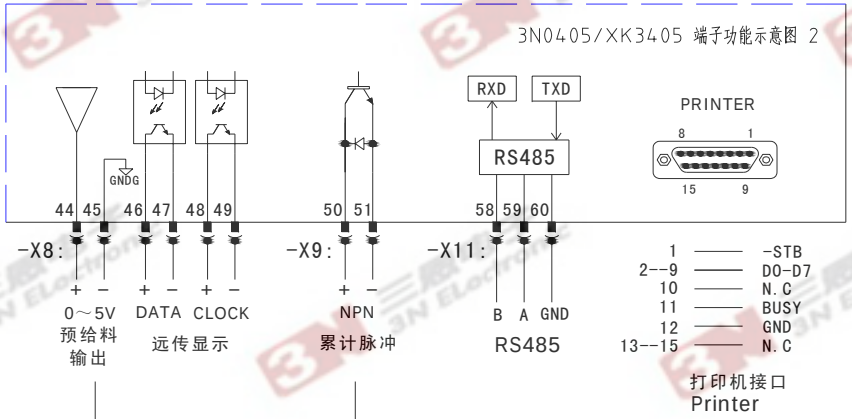
Name	Meaning	Format	Range	Unit	Mod	Default	Password
O0	Active/Stop Flow Section Adjust	X	0=No 1=Active	——	Y	0	——
O1	Coefficient 1	XX.XXXX	0.9～1.1	——	Y	0.9	Y
O2	Coefficient 2	XX.XXXX	0.9～1.1	——	Y	0.95	Y
O3	Coefficient 3	XX.XXXX	0.9～1.1	——	Y	1.05	N
O4	Coefficient 4	XX.XXXX	0.9～1.1	——	Y	1.1	N
O 5	Auto Print	0=Manual 1=Auto	0-1		Y	0	Y
O 6	First Report	XX	0-23 hour		Y	0	Y
O 7	Second Report	XX	0-23 hour		Y	0	Y
O 8	Third Report	XX	0-23 hour		Y	0	Y
O9	Forth Report	XX	0-23 hour		Y	0	Y

Appendix 6-1、 0405-Wiring Connection 1，2

Connectivity (1) (3N0405) 接线图（1）

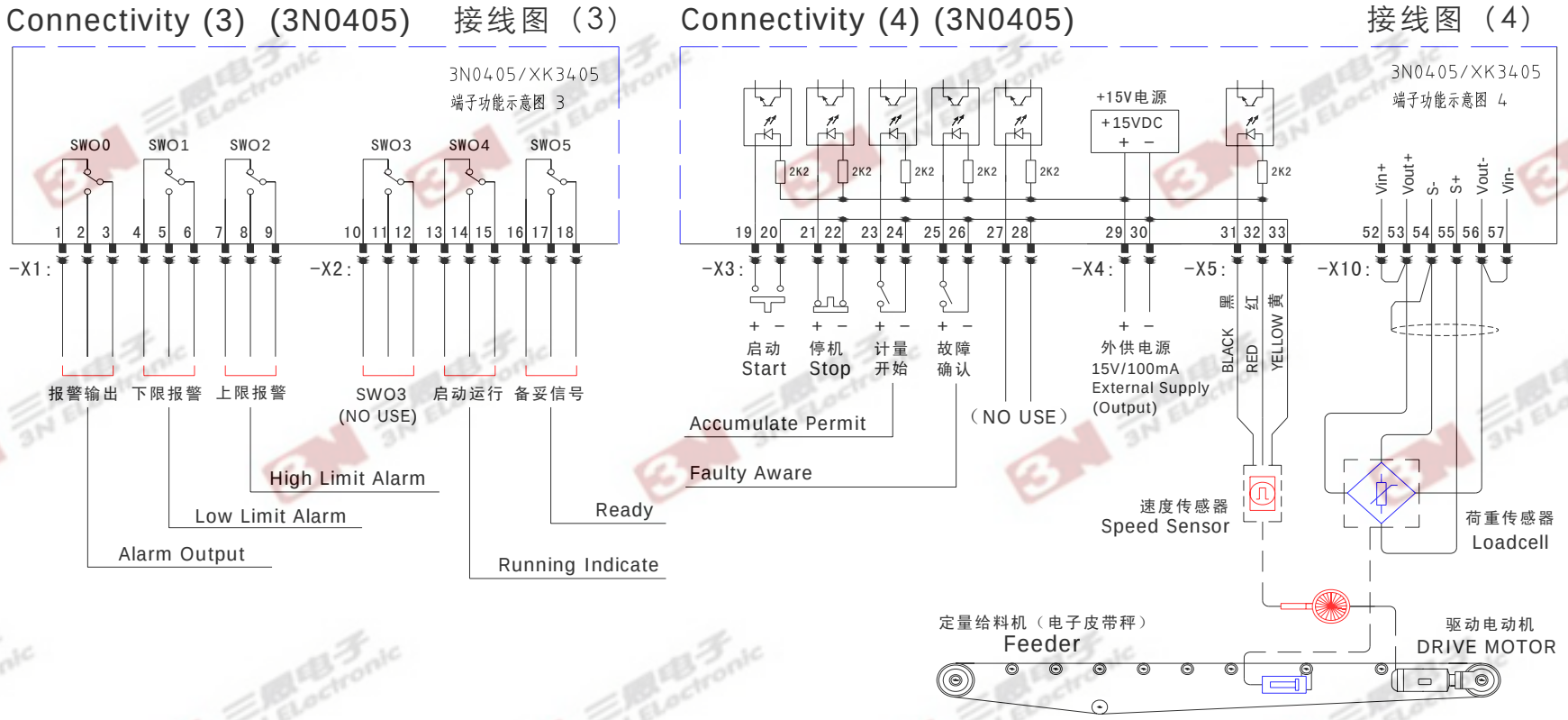


Connectivity (2) (3N0405) 接线图（2）



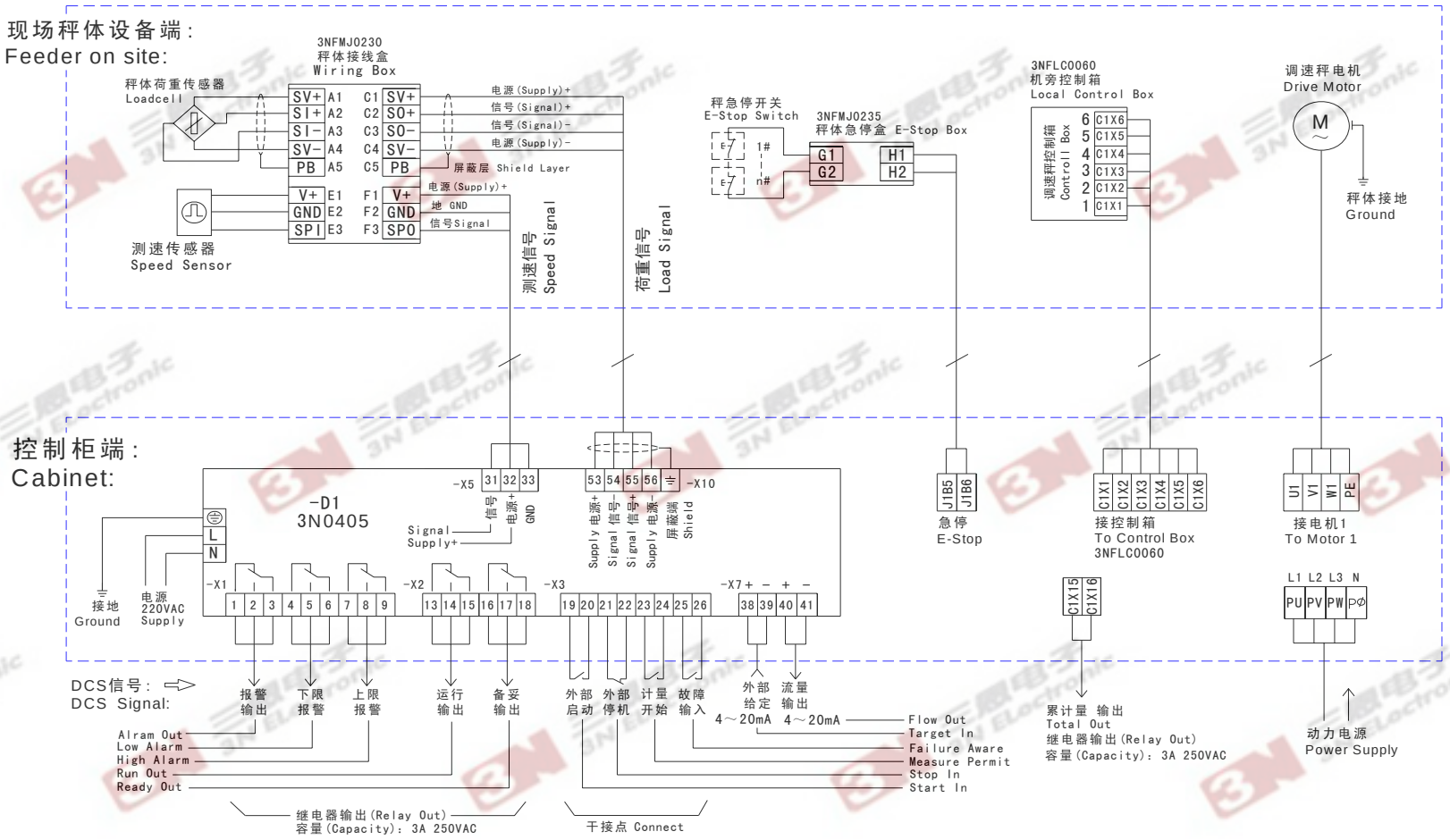
			3N SUNEN 三恩电子	名称	3N0405-E /XK3405 端子功能图 1/2
更改后文件图纸代号		签名	日期	上一级部装(或项目)名称	
设计	synka 20060105120	修改		○添加图纸 ○更改图纸	TEL: 0536-3152451
审核	lijun	批准		第 张 共 张	

Appendix 6-2：0405-Wiring Connection 3，4



				3N SUNEN 三恩电子	名称	3N0405-E /XK3405 端子功能图 3/4
更改后文件图纸代号		签名	日期	上一级部装(或项目)名称		
设计	sunka 2006/05/20	修改		○添加图纸 ○更改图纸		TEL: 0536-3152451
审核	lijun	批准		第 张	共 张	

Appendix 6-3：0405 Wiring To Speed Vary Feeder （Reference）

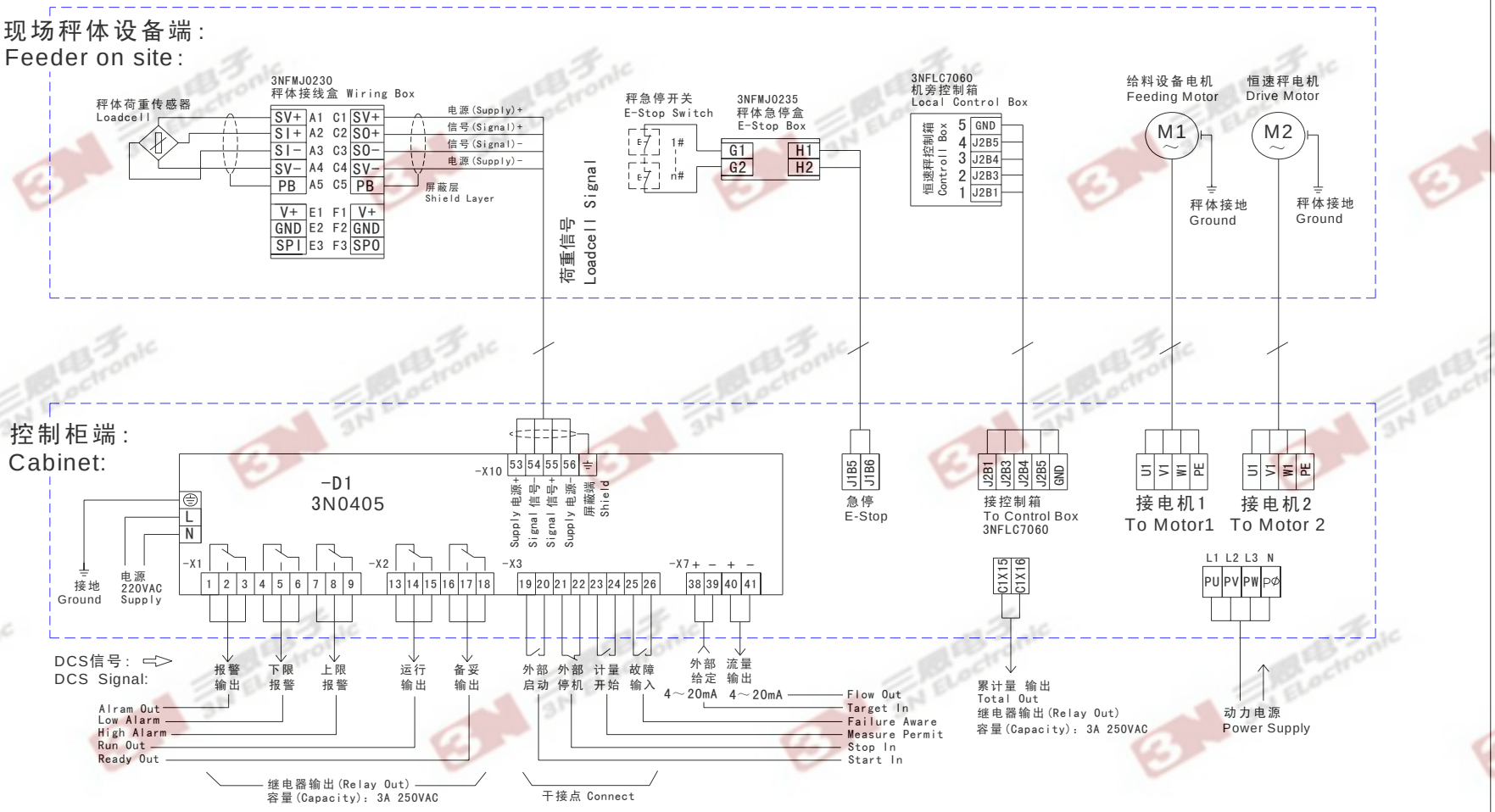


3N 调速秤系统：（ 接线图例 ）
3N Feeding System: Wiring and Cable

3N0405

SUNEN 三恩电子
TEL:0536-3152451

Appendix 6-4: 0405 Wiring to Speed Constant Feeder (Reference)



3N恒速秤系统:(接线图例)
3N Speed Constant System: Wiring and Cable

3N0405

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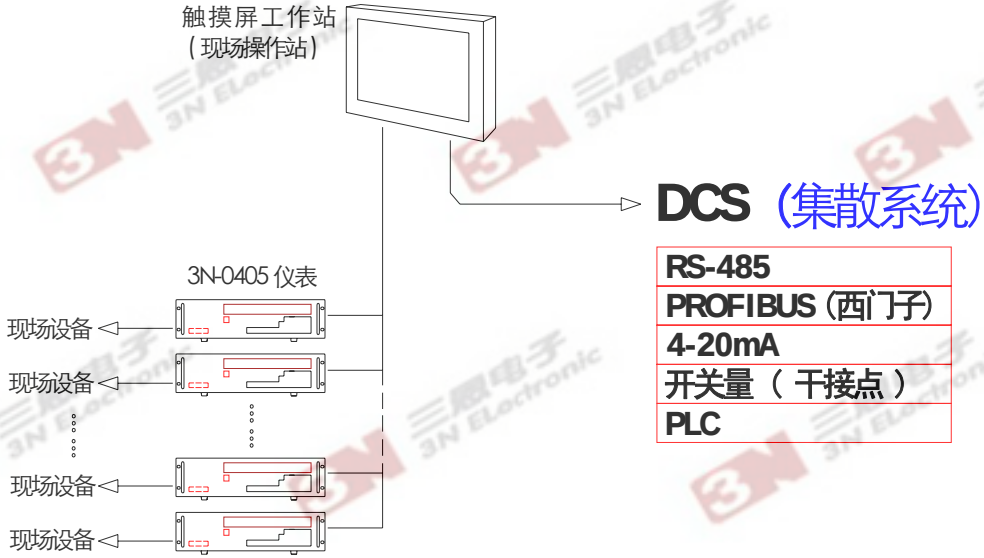
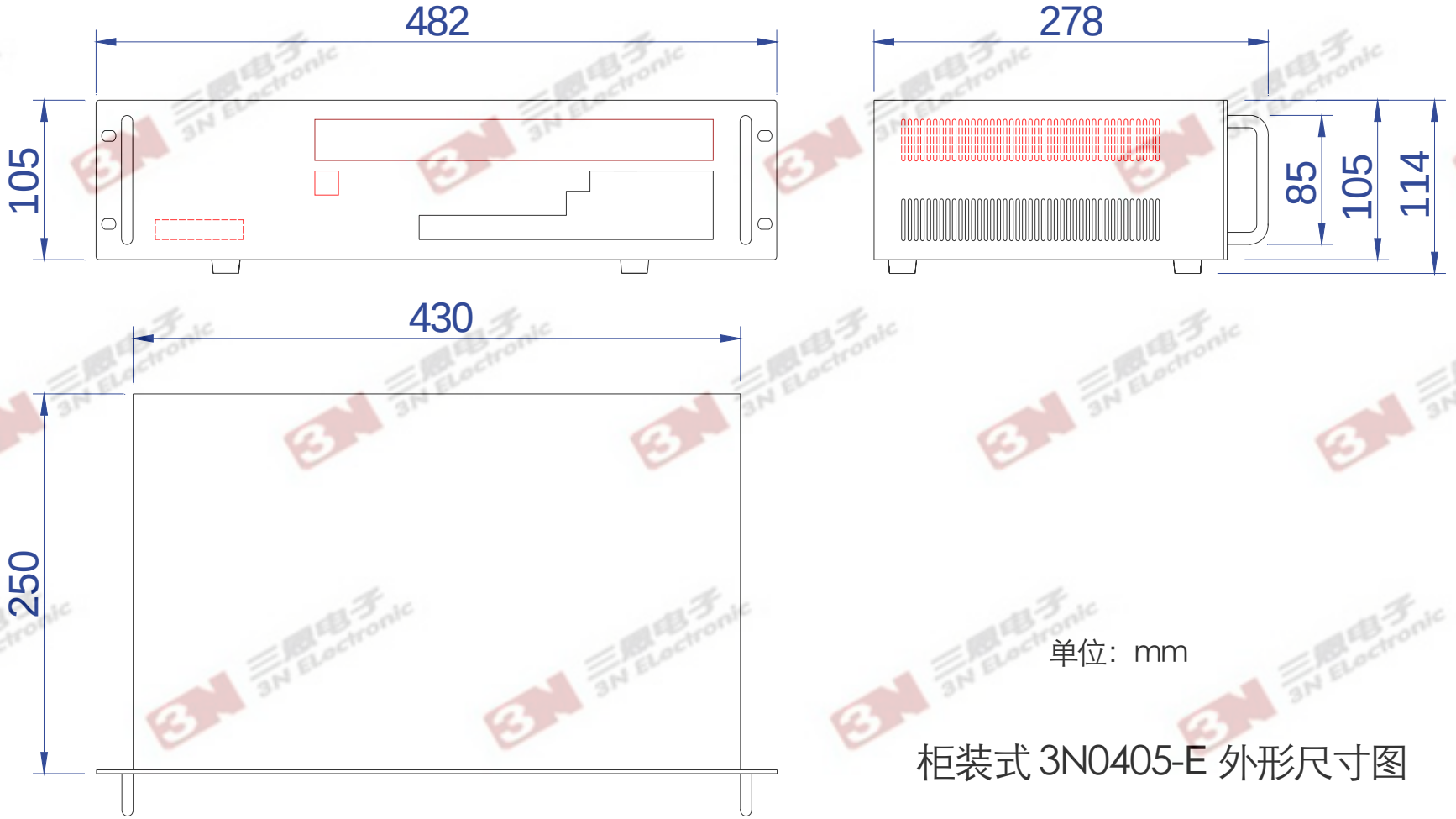
Appendix 6-5：3N-0405 With Touch Screen (Reference)



Appendix 6-6：3N-0405 Appearance Dimension Reference （ Cabinet



单位：mm

柜装式 3N0405-E 外形尺寸图