

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Please be informed that the data shown in this PDF Document is generated from our Online Catalog. Please find the complete data in the user's documentation. Our General Terms of Use for Downloads are valid (<http://phoenixcontact.com/download>)



Knife disconnect terminal block, With test socket screws for insertion of test plugs, nom. voltage: 500 V, nominal current: 20 A, connection method: Screw connection, cross section: 0.14 mm² - 6 mm², AWG: 26 - 10, length: 57.8 mm, width: 6.2 mm, color: gray, mounting: NS 35/7,5, NS 35/15

Your advantages

- ✓ Suitable for process technology, thanks to Ex nA approval
- ✓ Compact design and high current carrying capacity of 20 A
- ✓ Double bridge shaft enables individual potential distribution and supply

RoHS



Key Commercial Data

Packing unit	1 pc
Minimum order quantity	50 pc
GTIN	 4 046356 918459
GTIN	4046356918459
Weight per Piece (excluding packing)	14.000 g
Custom tariff number	85369010
Country of origin	Poland

Technical data

General

Number of levels	1
Number of connections	2
Nominal cross section	4 mm ²
Color	gray
Insulating material	PA
Flammability rating according to UL 94	V0

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Technical data

General

Area of application	Machine building
	Plant engineering
Rated surge voltage	6 kV
Degree of pollution	3
Overvoltage category	III
Insulating material group	I
Connection in acc. with standard	IEC 60947-7-1
Nominal current I_N	20 A
Maximum load current	20 A (with 6 mm ² conductor cross section)
Nominal voltage U_N	500 V
Open side panel	No
Relative insulation material temperature index (Elec., UL 746 B)	130 °C
Temperature index of insulation material (DIN EN 60216-1 (VDE 0304-21))	125 °C
Static insulating material application in cold	-60 °C
Behavior in fire for rail vehicles (DIN 5510-2)	Test passed
Flame test method (DIN EN 60695-11-10)	V0
Oxygen index (DIN EN ISO 4589-2)	>32 %
NF F16-101, NF F10-102 Class I	2
NF F16-101, NF F10-102 Class F	2
Surface flammability NFPA 130 (ASTM E 162)	passed
Specific optical density of smoke NFPA 130 (ASTM E 662)	passed
Smoke gas toxicity NFPA 130 (SMP 800C)	passed
Calorimetric heat release NFPA 130 (ASTM E 1354)	27,5 MJ/kg
Fire protection for rail vehicles (DIN EN 45545-2) R22	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R23	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R24	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R26	HL 1 - HL 3

Dimensions

Width	6.2 mm
Length	57.8 mm
Height NS 35/7,5	49.1 mm
Height NS 35/15	56.6 mm

Connection data

Conductor cross section solid min.	0.14 mm ²
Conductor cross section solid max.	6 mm ²
Conductor cross section flexible min.	0.14 mm ²

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Technical data

Connection data

Conductor cross section flexible max.	6 mm ²
Conductor cross section AWG min.	26
Conductor cross section AWG max.	10
Conductor cross section flexible, with ferrule without plastic sleeve min.	0.14 mm ²
Conductor cross section flexible, with ferrule without plastic sleeve max.	4 mm ²
Conductor cross section flexible, with ferrule with plastic sleeve min.	0.14 mm ²
Conductor cross section flexible, with ferrule with plastic sleeve max.	4 mm ²
2 conductors with same cross section, solid min.	0.14 mm ²
2 conductors with same cross section, solid max.	1.5 mm ²
2 conductors with same cross section, stranded min.	0.14 mm ²
2 conductors with same cross section, stranded max.	1.5 mm ²
2 conductors with same cross section, stranded, ferrules without plastic sleeve, min.	0.14 mm ²
2 conductors with same cross section, stranded, ferrules without plastic sleeve, max.	1.5 mm ²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, min.	0.5 mm ²
2 conductors with same cross section, stranded, TWIN ferrules with plastic sleeve, max.	2.5 mm ²
Connection method	Screw connection
Stripping length	9 mm
Internal cylindrical gage	A4
Screw thread	M3
Tightening torque, min	0.6 Nm
Tightening torque max	0.8 Nm

Standards and Regulations

Connection in acc. with standard	IEC 60947-7-1
Flammability rating according to UL 94	V0
Fire protection for rail vehicles (DIN EN 45545-2) R22	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R23	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R24	HL 1 - HL 3
Fire protection for rail vehicles (DIN EN 45545-2) R26	HL 1 - HL 3

Environmental Product Compliance

	Lead 7439-92-1
China RoHS	Environmentally Friendly Use Period = 50
	For details about hazardous substances go to tab "Downloads", Category "Manufacturer's declaration"

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Drawings

Circuit diagram



Classifications

eCl@ss

eCl@ss 4.0	27141100
eCl@ss 4.1	27141100
eCl@ss 5.0	27141100
eCl@ss 5.1	27141100
eCl@ss 6.0	27141100
eCl@ss 7.0	27141126
eCl@ss 8.0	27141126
eCl@ss 9.0	27141126

ETIM

ETIM 2.0	EC000902
ETIM 3.0	EC000902
ETIM 4.0	EC000902
ETIM 5.0	EC000902
ETIM 6.0	EC000902
ETIM 7.0	EC000902

UNSPSC

UNSPSC 6.01	30211811
UNSPSC 7.0901	39121410
UNSPSC 11	39121410
UNSPSC 12.01	39121410
UNSPSC 13.2	39121410

Approvals

Approvals

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Approvals

Approvals

EAC

Ex Approvals

IECEX / ATEX / UL Recognized / cUL Recognized / CSA / cULus Recognized

Approval details

EAC		RU C- DE.A*30.B.01742
-----	--	--------------------------

Accessories

Accessories

DIN rail

DIN rail perforated - NS 35/ 7,5 PERF 2000MM - 0801733



DIN rail perforated, Standard profile, width: 35 mm, height: 7.5 mm, acc. to EN 60715, material: Steel, galvanized, passivated with a thick layer, length: 2000 mm, color: silver

DIN rail, unperforated - NS 35/ 7,5 UNPERF 2000MM - 0801681



DIN rail, unperforated, Standard profile, width: 35 mm, height: 7.5 mm, acc. to EN 60715, material: Steel, galvanized, passivated with a thick layer, length: 2000 mm, color: silver

DIN rail perforated - NS 35/ 7,5 WH PERF 2000MM - 1204119



DIN rail perforated, Standard profile, width: 35 mm, height: 7.5 mm, acc. to EN 60715, material: Steel, Galvanized, white passivated, length: 2000 mm, color: silver

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

DIN rail, unperforated - NS 35/ 7,5 WH UNPERF 2000MM - 1204122



DIN rail, unperforated, Standard profile, width: 35 mm, height: 7.5 mm, acc. to EN 60715, material: Steel, Galvanized, white passivated, length: 2000 mm, color: silver

DIN rail, unperforated - NS 35/ 7,5 AL UNPERF 2000MM - 0801704



DIN rail, unperforated, Standard profile, width: 35 mm, height: 7.5 mm, acc. to EN 60715, material: Aluminum, uncoated, length: 2000 mm, color: silver

DIN rail perforated - NS 35/ 7,5 ZN PERF 2000MM - 1206421



DIN rail perforated, Standard profile, width: 35 mm, height: 7.5 mm, acc. to EN 60715, material: Steel, galvanized, length: 2000 mm, color: silver

DIN rail, unperforated - NS 35/ 7,5 ZN UNPERF 2000MM - 1206434



DIN rail, unperforated, Standard profile, width: 35 mm, height: 7.5 mm, acc. to EN 60715, material: Steel, galvanized, length: 2000 mm, color: silver

DIN rail, unperforated - NS 35/ 7,5 CU UNPERF 2000MM - 0801762



DIN rail, unperforated, Standard profile, width: 35 mm, height: 7.5 mm, acc. to EN 60715, material: Copper, uncoated, length: 2000 mm, color: copper-colored

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

End cap - NS 35/ 7,5 CAP - 1206560

DIN rail end piece, for DIN rail NS 35/7.5



DIN rail perforated - NS 35/15 PERF 2000MM - 1201730



DIN rail perforated, Standard profile, width: 35 mm, height: 15 mm, similar to EN 60715, material: Steel, galvanized, passivated with a thick layer, length: 2000 mm, color: silver

DIN rail, unperforated - NS 35/15 UNPERF 2000MM - 1201714



DIN rail, unperforated, Standard profile, width: 35 mm, height: 15 mm, similar to EN 60715, material: Steel, galvanized, passivated with a thick layer, length: 2000 mm, color: silver

DIN rail perforated - NS 35/15 WH PERF 2000MM - 0806602



DIN rail perforated, Standard profile, width: 35 mm, height: 15 mm, similar to EN 60715, material: Steel, Galvanized, white passivated, length: 2000 mm, color: silver

DIN rail, unperforated - NS 35/15 WH UNPERF 2000MM - 1204135



DIN rail, unperforated, Standard profile, width: 35 mm, height: 15 mm, similar to EN 60715, material: Steel, Galvanized, white passivated, length: 2000 mm, color: silver

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

DIN rail, unperforated - NS 35/15 AL UNPERF 2000MM - 1201756



DIN rail, unperforated, Standard profile, width: 35 mm, height: 15 mm, similar to EN 60715, material: Aluminum, uncoated, length: 2000 mm, color: silver

DIN rail perforated - NS 35/15 ZN PERF 2000MM - 1206599



DIN rail perforated, Standard profile, width: 35 mm, height: 15 mm, similar to EN 60715, material: Steel, galvanized, length: 2000 mm, color: silver

DIN rail, unperforated - NS 35/15 ZN UNPERF 2000MM - 1206586



DIN rail, unperforated, Standard profile, width: 35 mm, height: 15 mm, similar to EN 60715, material: Steel, galvanized, length: 2000 mm, color: silver

DIN rail, unperforated - NS 35/15 CU UNPERF 2000MM - 1201895



DIN rail, unperforated, Standard profile, width: 35 mm, height: 15 mm, similar to EN 60715, material: Copper, uncoated, length: 2000 mm, color: copper-colored

End cap - NS 35/15 CAP - 1206573



DIN rail end piece, for DIN rail NS 35/15

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

DIN rail, unperforated - NS 35/15-2,3 UNPERF 2000MM - 1201798



DIN rail, unperforated, Standard profile 2.3 mm, width: 35 mm, height: 15 mm, acc. to EN 60715, material: Steel, galvanized, passivated with a thick layer, length: 2000 mm, color: silver

End block

End clamp - CLIPFIX 35 - 3022218



Quick mounting end clamp for NS 35/7,5 DIN rail or NS 35/15 DIN rail, with marking option, width: 9.5 mm, color: gray

End clamp - CLIPFIX 35-5 - 3022276



Quick mounting end clamp for NS 35/7,5 DIN rail or NS 35/15 DIN rail, with marking option, with parking option for FBS...5, FBS...6, KSS 5, KSS 6, width: 5.15 mm, color: gray

End clamp - E/NS 35 N - 0800886



End clamp, width: 9.5 mm, color: gray

Insulating sleeve

Insulating sleeve - MPS-IH WH - 0201663

Insulating sleeve, color: white



Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Insulating sleeve - MPS-IH RD - 0201676

Insulating sleeve, color: red



Insulating sleeve - MPS-IH BU - 0201689

Insulating sleeve, color: blue



Insulating sleeve - MPS-IH YE - 0201692

Insulating sleeve, color: yellow



Insulating sleeve - MPS-IH GN - 0201702

Insulating sleeve, color: green



Insulating sleeve - MPS-IH GY - 0201728

Insulating sleeve, color: gray



Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Insulating sleeve - MPS-IH BK - 0201731

Insulating sleeve, color: black



Jumper

Plug-in bridge - FBS 2-6 - 3030336



Plug-in bridge, pitch: 6.2 mm, width: 10.7 mm, number of positions: 2, color: red

Plug-in bridge - FBS 3-6 - 3030242



Plug-in bridge, pitch: 6.2 mm, width: 16.9 mm, number of positions: 3, color: red

Plug-in bridge - FBS 4-6 - 3030255



Plug-in bridge, pitch: 6.2 mm, width: 23.1 mm, number of positions: 4, color: red

Plug-in bridge - FBS 5-6 - 3030349



Plug-in bridge, pitch: 6.2 mm, width: 29.3 mm, number of positions: 5, color: red

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Plug-in bridge - FBS 6-6 - 1008238



Plug-in bridge, One side not fully isolated, pitch: 6.2 mm, width: 35.5 mm, number of positions: 6, color: red

Plug-in bridge - FBS 10-6 - 3030271



Plug-in bridge, pitch: 6.2 mm, width: 60.3 mm, number of positions: 10, color: red

Plug-in bridge - FBS 20-6 - 3030365



Plug-in bridge, pitch: 6.2 mm, width: 122.3 mm, number of positions: 20, color: red

Plug-in bridge - FBS 50-6 - 3032224



Plug-in bridge, pitch: 6.2 mm, width: 308.3 mm, number of positions: 50, color: red

Plug-in bridge - FBSR 2-6 - 3033715



Plug-in bridge, pitch: 6.2 mm, number of positions: 2, color: red

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Plug-in bridge - FBSR 3-6 - 3001594



Plug-in bridge, pitch: 6.2 mm, number of positions: 3, color: red

Plug-in bridge - FBSR 4-6 - 3001595



Plug-in bridge, pitch: 6.2 mm, number of positions: 4, color: red

Plug-in bridge - FBSR 5-6 - 3001596



Plug-in bridge, pitch: 6.2 mm, number of positions: 5, color: red

Plug-in bridge - FBSR 10-6 - 3033716



Plug-in bridge, pitch: 6.2 mm, number of positions: 10, color: red

Plug-in bridge - FBS 2-6 BU - 3036932



Plug-in bridge, pitch: 6.2 mm, width: 10.7 mm, number of positions: 2, color: blue

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Plug-in bridge - FBS 3-6 BU - 3036945



Plug-in bridge, pitch: 6.2 mm, width: 16.9 mm, number of positions: 3, color: blue

Plug-in bridge - FBS 4-6 BU - 3036958



Plug-in bridge, pitch: 6.2 mm, width: 23.1 mm, number of positions: 4, color: blue

Plug-in bridge - FBS 5-6 BU - 3036961



Plug-in bridge, pitch: 6.2 mm, width: 29.3 mm, number of positions: 5, color: blue

Plug-in bridge - FBS 10-6 BU - 3032198



Plug-in bridge, pitch: 6.2 mm, width: 60.3 mm, number of positions: 10, color: blue

Plug-in bridge - FBS 20-6 BU - 3032208



Plug-in bridge, pitch: 6.2 mm, width: 122.3 mm, number of positions: 20, color: blue

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Plug-in bridge - FBS 50-6 BU - 3032211



Plug-in bridge, pitch: 6.2 mm, width: 308.3 mm, number of positions: 50, color: blue

Labeled terminal marker

Zack marker strip - ZB 6 CUS - 0824992



Zack marker strip, can be ordered: Strip, white, labeled according to customer specifications, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 6.15 x 10.5 mm, Number of individual labels: 10

Zack marker strip - ZB 6,LGS:FORTL.ZAHLEN - 1051016



Zack marker strip, Strip, white, labeled, can be labeled with: CMS-P1-PLOTTER, printed horizontally: consecutive numbers 1 ... 10, 11 ... 20, etc. up to 491 ... 500, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 6.15 x 10.5 mm, Number of individual labels: 10

Zack marker strip - ZB 6,QR:FORTL.ZAHLEN - 1051029



Zack marker strip, Strip, white, labeled, can be labeled with: CMS-P1-PLOTTER, Printed vertically: consecutive numbers 1 ... 10, 11 ... 20, etc. up to 491 ... 500, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 6.15 x 10.5 mm, Number of individual labels: 10

Zack marker strip - ZB 6,LGS:GLEICHE ZAHLEN - 1051032



Zack marker strip, Strip, white, labeled, can be labeled with: CMS-P1-PLOTTER, printed horizontally: Identical numbers 1 or 2, etc. up to 100, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 6.15 x 10.5 mm, Number of individual labels: 10

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Marker for terminal blocks - ZB 6,LGS:L1-N,PE - 1051414



Marker for terminal blocks. Strip, white, labeled, can be labeled with: CMS-P1-PLOTTER, Horizontal: L1, L2, L3, N, PE, L1, L2, L3, N, PE, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 6.15 x 10.5 mm, Number of individual labels: 10

Marker for terminal blocks - ZB 6,LGS:U-N - 1051430



Marker for terminal blocks. Strip, white, labeled, can be labeled with: CMS-P1-PLOTTER, printed horizontally: U, V, W, N, GND, U, V, W, N, GND, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 6.15 x 10.5 mm, Number of individual labels: 10

Marker for terminal blocks - UC-TM 6 CUS - 0824589



Marker for terminal blocks, can be ordered: by sheet, white, labeled according to customer specifications, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 5.6 x 10.5 mm, Number of individual labels: 80

Marker for terminal blocks - UCT-TM 6 CUS - 0829602



Marker for terminal blocks, can be ordered: by sheet, white, labeled according to customer specifications, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 5.6 x 10.5 mm, Number of individual labels: 60

Marker pen

Marker pen - X-PEN 0,35 - 0811228



Marker pen without ink cartridge, for manual labeling of markers, labeling extremely wipe-proof, line thickness 0.35 mm

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Partition plate

Partition plate - ATP-UT-TWIN - 3047183



Partition plate, length: 62.1 mm, width: 2.2 mm, height: 52.5 mm, color: gray

Reducing bridge

Reducing bridge - RB UT 10-(2,5/4) - 3047060



Reducing bridge, pitch: 10.2 mm, length: 29.3 mm, width: 15.1 mm, number of positions: 2, color: red

Screwdriver tools

Screwdriver - SZS 0,6X3,5 - 1205053



Actuation tool, for ST terminal blocks, insulated, also suitable for use as a bladed screwdriver, size: 0.6 x 3.5 x 100 mm, 2-component grip, with non-slip grip

Screwdriver - SZG 0,6X3,5 VDE - 1205121



Screwdriver, slot-headed, graded, for test socket screws, size: 0.6 x 3.5 x 100 mm, 2-component grip, with non-slip grip

Short-circuit connector

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Short-circuit connector - FBSRH 2-6 - 3033812



Short-circuit connector, pitch: 6.2 mm, number of positions: 2, color: red

Switching lock

Switching lock - S-MT - 3247954



Switching lock, length: 10.5 mm, width: 3.5 mm, height: 23.1 mm, color: white

Switching lock - S-MT - 3247954



Switching lock, length: 10.5 mm, width: 3.5 mm, height: 23.1 mm, color: white

Terminal marking

Zack marker strip - ZB 6:UNBEDRUCKT - 1051003



Zack marker strip, Strip, white, unlabeled, can be labeled with: PLOTMARK, CMS-P1-PLOTTER, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 6.15 x 10.5 mm, Number of individual labels: 10

Marker for terminal blocks - UC-TM 6 - 0818085



Marker for terminal blocks, Sheet, white, unlabeled, can be labeled with: BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, PLOTMARK, CMS-P1-PLOTTER, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 5.6 x 10.5 mm, Number of individual labels: 80

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Marker for terminal blocks - UCT-TM 6 - 0828736



Marker for terminal blocks, Sheet, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: snap into tall marker groove, for terminal block width: 6.2 mm, lettering field size: 5.6 x 10.5 mm, Number of individual labels: 60

Test plug terminal block

Test plugs - MPS-MT - 0201744



Test plugs, with solder connection up to 1 mm² conductor cross section, color: gray

Test plugs - PS-6 - 3030996



Test plugs, color: red

Test plugs - PS-6/2,3MM RD - 3038736



Test plugs, color: red

Test socket

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Test adapter - PAI-4-FIX-5/6 BU - 3035975



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Test adapter - PAI-4-FIX-5/6 OG - 3035974



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Test adapter - PAI-4-FIX-5/6 YE - 3035977



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Test adapter - PAI-4-FIX-5/6 RD - 3035976



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Test adapter - PAI-4-FIX-5/6 GN - 3035978



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Test adapter - PAI-4-FIX-5/6 BK - 3035980



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Test adapter - PAI-4-FIX-5/6 GY - 3035982



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Test adapter - PAI-4-FIX-5/6 VT - 3035979



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Test adapter - PAI-4-FIX-5/6 BN - 3035981



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Test adapter - PAI-4-FIX-5/6 WH - 3035983



4 mm test adapter, for terminal blocks with 5.2 mm and 6.2 mm pitch

Knife disconnect terminal block - UT 4-MT-P/P-EX - 3046173

Accessories

Test adapter - PAI-4-N GY - 3032871



4 mm test adapter, for terminal blocks with 5.2 mm, 6.2 mm and 8.2 mm pitch
