Fluke DSX-600 Series

CableAnalyzer™

Eksempel på test af pds-kabelsæt

Version 07
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Indhold

Indledning

Kære kollega!
Dette er ikke en fyldestgørende manual, der behandler alle muligheder og aspekter inden for test af pds-kabler med Fluke DSX-600 Series Cableanalyzer™, men blot en beskrivelse af, hvordan du eventuelt kan løse den type opgaver.
Dette kan gøres på flere forskellige måder, alt afhængigt af dit temperament, krav til kvalitet og dokumentation med videre.
Derfor er det en god idé, hvis du yderligere sikrer dig nødvendig viden via Flukes originale manualer:

- *"DSX-600 CableAnalyzer Getting Started Guide"* (Se sidst i dette dokument)
- *"DSX-600 Series CableAnalyze Users Manual"*

Det kan i øvrigt stærkt anbefales, at du opretter dig som bruger hos Fluke Networks.

- https://www.flukenetworks.com/

Så kan du holde dig opdateret med: Support, nyheder, downloads og Oneline Training med videre.

Endvidere er det en god idé, hvis du i forvejen har basale kundskaber om netværk og brug af pc. Herunder filhåndtering.
Det sidste fordi det efterfølgende eksempel tager udgangspunkt i, at diverse opsætning af projektet, samt efterfølgende arkivering af testrapporter, foretages på pc ved:

- *Microsoft Excel* regneark eller lignende
- *Microsoft Notepad* eller lignende
- *Fluke Networks LinkWare™ PC*

Et andet sted, du med fordel kan oprette dig som bruger, er Schneider Electric:

- https://se-dk.docebosaas.com/pages/19/oversigt-elektriker

De har rigtig gode tilbud om support, og læring.
Selvom det måske ikke er deres produkter, du har med at gøre til din aktuelle opgave, er der alligevel generelt god viden at hente der.

Kort om eksemplet

Der er i alt 39 stk. pds-kabler til forskellige formål.

- CCTV - Videoovervågning
- WiFi - Accespoints
- EVOCO - Infoskærme ved møderum
- TV - Skærme i møderum og fællesarealer
- Desktop - Arbejdsstationer

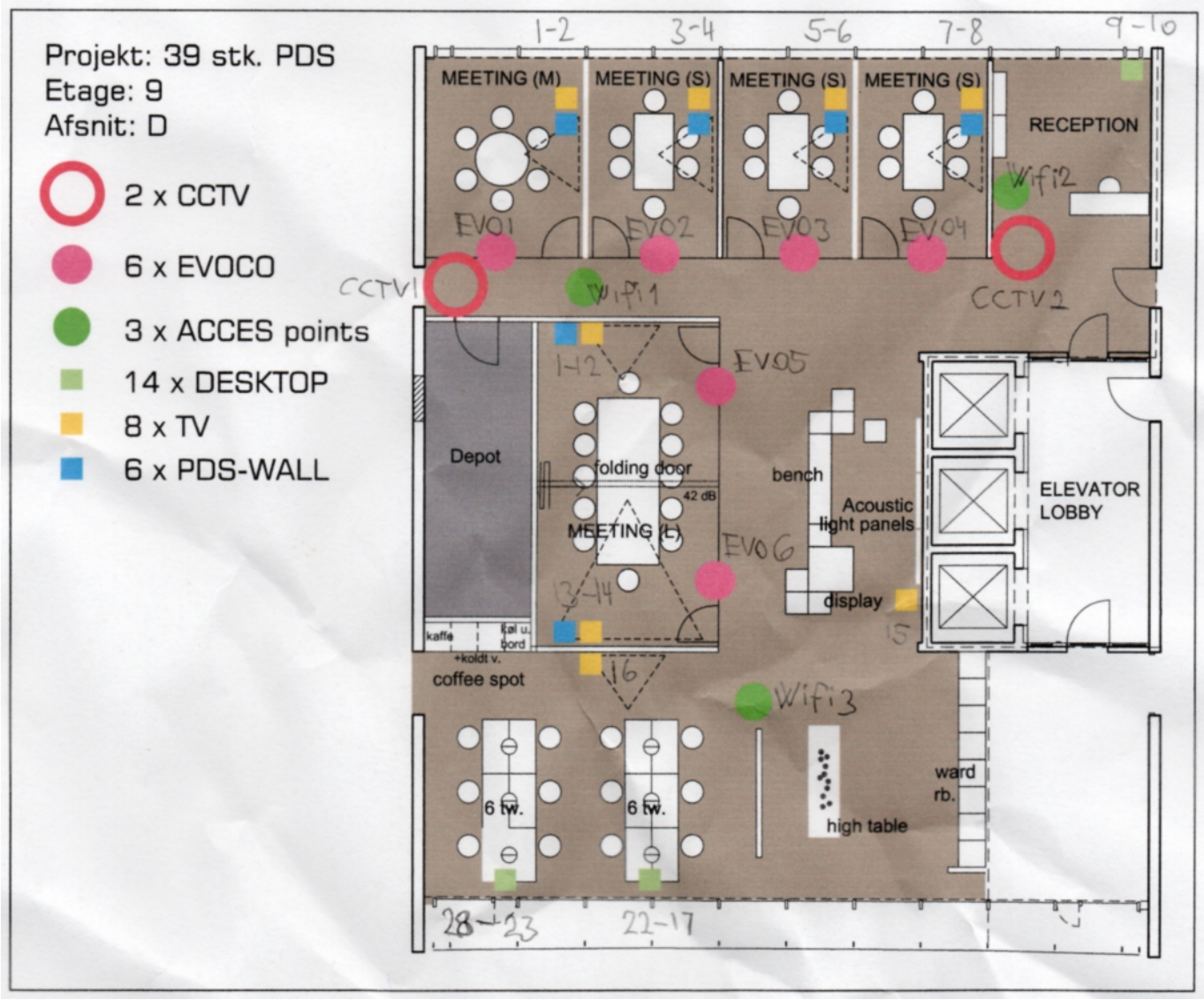
Kablerne er trukket over loft, i væg og i kabelkanaler til 2 stk. rack-skabe, der står i hvert sit rum.
På plantegning er lavet foreløbig opmærkning med blyandt.

Kablet:
Schneider Electric Actassi CL-MXC6A **VDICD68Xxxx Series Cat6A** 100Ω 550MHz F/FTP LSZH Euroclass Dca s2diai **NVP 82%** ISO/IEC 11801 Ed 2.2 ANATEL 3894-15-6206 EC VERIFIED FY2119 OF 106958730

Opmærkning

Opmærkning foretages for, til enhver tid at kunne identificere og lokalisere ethvert kabel, og kabelelement, samt placering i bygning og rack med videre.
Meget stor omhyggelighed er derfor essentielt i alle faser af denne operation.
Lige fra notering af foreløbige kabelnumre på kabel og plantegning, til endelig opmærkning ved pds-udtag og i rack.
Som sagt vil du spare dig selv for unødvendigt arbejde, hvis du også er omhyggelig med den foreløbige nummerering på kablerne. Med det menes, at være så systematisk og logisk som muligt.
Fx sådan at de laveste numre placeres på samme måde. Til højre hvis der er flere udtag ved siden af hinanden, eller øverst, hvis der er flere udtag over hinanden.
Det gør det efterfølgende arbejde med test af kablerne, og placering af konnektorer i patchpanel i rack nemmere, hvis den samme systematik er brugt.
Når dette er sagt, sker det ind i mellem, at der tilføjes eller ændres kabler og kabelføring, efter at arbejdet er startet.

Foreløbig opmærkning på plantegning



Opmærkningningsliste

Det vil som regel være en fordel, hvis liste med foreløbige og permanente kablenumre, laves inden arbejdet med at trække kabler startes.
Her er anvendt Excel-regneark til listen.

Typisk indeholder det endelige kabelnummer:

- Rack-nummer/identifikation
- Patch-panel-nummer
- Nummer på PDS-udtag/stik

Kunden kan dog have særlige ønsker til numre/identifikation.

Listen kan indeholde yderligere information alt efter behov.
Fx totalantal, rackplacering, placering i rum, og et felt til når kablet er testet ok mv.

	A	B	C	D	E	F	G	H	I	J	K	L
1	Type	Placering i rum	Totalantal	Antal i serie	Opmærkning på tegning	Rack	Opmærkning i rack	Par	Panel nummer	Nummer i patchpanel	Rack-placering	Testet OK
2	CCTV	Over loft	1	1	CCTV1	UX01	UX01-P01-01		1	1	Patch-rum	OK
3	CCTV	Over loft	2	2	CCTV2	UX01	UX01-P01-02		1	2	Patch-rum	OK
4	ACCES	Over loft	3	1	WiFi1	UX02	UX02-P01-01		1	1	Server-rum	OK
5	ACCES	Over loft	4	2	WiFi2	UX02	UX02-P01-02		1	2	Server-rum	OK
6	ACCES	Over loft	5	3	WiFi3	UX02	UX02-P01-03		1	3	Server-rum	OK
7	EVOCO	Over loft	6	1	EVO1	UX02	UX02-P01-04		1	4	Server-rum	OK
8	EVOCO	Over loft	7	2	EVO2	UX02	UX02-P01-05		1	5	Server-rum	OK
9	EVOCO	Over loft	8	3	EVO3	UX02	UX02-P01-06		1	6	Server-rum	OK
10	EVOCO	Over loft	9	4	EVO4	UX02	UX02-P01-07		1	7	Server-rum	OK
11	EVOCO	Over loft	10	5	EVO5	UX02	UX02-P01-08		1	8	Server-rum	OK
12	EVOCO	Over loft	11	6	EVO6	UX02	UX02-P01-09		1	9	Server-rum	OK
13	TV	På væg	12	1	1	UX01	UX01-P01-03		1	3	Patch-rum	OK
14	TV	På væg	13	2	3	UX01	UX01-P01-04		1	4	Patch-rum	OK
15	TV	På væg	14	3	5	UX01	UX01-P01-05		1	5	Patch-rum	OK
16	TV	På væg	15	4	7	UX01	UX01-P01-06		1	6	Patch-rum	OK
17	TV	På væg	16	5	11	UX01	UX01-P01-07		1	7	Patch-rum	OK
18	TV	På væg	17	6	13	UX01	UX01-P01-08		1	8	Patch-rum	OK
19	TV	Under loft	18	7	15	UX01	UX01-P01-09		1	9	Patch-rum	OK
20	TV	Under loft	19	8	16	UX01	UX01-P01-10		1	10	Patch-rum	OK
21	DESKTOP	I kanal	20	1	9	UX01	UX01-P01-11	\	1	11	Patch-rum	OK
22	DESKTOP	I kanal	21	2	10	UX01	UX01-P01-12	/	1	12	Patch-rum	OK
23	DESKTOP	I kanal	22	3	17	UX01	UX01-P01-13	\	1	13	Patch-rum	OK
24	DESKTOP	I kanal	23	4	18	UX01	UX01-P01-14	/	1	14	Patch-rum	OK
25	DESKTOP	I kanal	24	5	19	UX01	UX01-P01-15	\	1	15	Patch-rum	OK
26	DESKTOP	I kanal	25	6	20	UX01	UX01-P01-16	/	1	16	Patch-rum	OK
27	DESKTOP	I kanal	26	7	21	UX01	UX01-P01-17	\	1	17	Patch-rum	OK
28	DESKTOP	I kanal	27	8	22	UX01	UX01-P01-18	/	1	18	Patch-rum	OK
29	DESKTOP	I kanal	28	9	23	UX01	UX01-P01-19	\	1	19	Patch-rum	OK
30	DESKTOP	I kanal	29	10	24	UX01	UX01-P01-20	/	1	20	Patch-rum	OK
31	DESKTOP	I kanal	30	11	25	UX01	UX01-P01-21	\	1	21	Patch-rum	OK
32	DESKTOP	I kanal	31	12	26	UX01	UX01-P01-22	/	1	22	Patch-rum	OK
33	DESKTOP	I kanal	32	13	27	UX01	UX01-P01-23	\	1	23	Patch-rum	OK
34	DESKTOP	I kanal	33	14	28	UX01	UX01-P01-24	/	1	24	Patch-rum	OK
35	PDS-WALL	På væg	34	1	2	UX01	UX01-P02-01		2	1	Patch-rum	OK
36	PDS-WALL	På væg	35	2	4	UX01	UX01-P02-02		2	2	Patch-rum	OK
37	PDS-WALL	På væg	36	3	6	UX01	UX01-P02-03		2	3	Patch-rum	OK
38	PDS-WALL	På væg	37	4	8	UX01	UX01-P02-04		2	4	Patch-rum	OK
39	PDS-WALL	På væg	38	5	12	UX01	UX01-P02-05		2	5	Patch-rum	OK
40	PDS-WALL	På væg	39	6	14	UX01	UX01-P02-06		2	6	Patch-rum	OK

Connectors, Keys, and LEDs

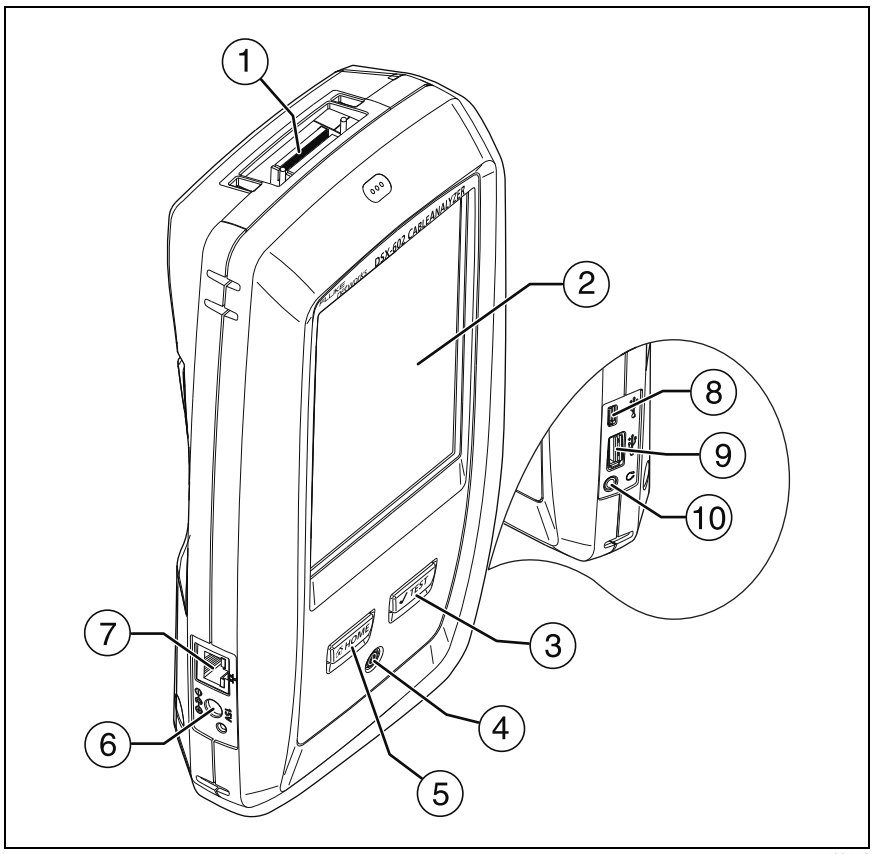


Figure 1. Main Tester Connectors, Keys, and LEDs (DSX-602 shown)

1. Connector for a link interface adapter
2. LCD display with touchscreen
3. TEST: Starts a test. Turns on the tone generator if a remote tester is not connected to the main tester. To start a test, you can also tap **TEST** on the display.
4. ⏻: Power key
5. HOME: Press HOME to go to the home screen.
6. Connector for the AC adapter. The LED is red when the battery charges, and green when the battery is fully charged. The LED is yellow if the battery will not charge. See "Charge the Battery" on page 14.
7. RJ45 connector: Lets you connect to a network for access to Fluke Networks cloud services.
8. Micro-AB USB port: This USB port lets you connect the tester to a PC so you can upload test results to the PC and install software updates in the tester.
9. Type A USB port: This USB host port lets you save test results on a USB flash drive. On a DSX-600 main tester, this port lets you or connect a Wi-Fi adapter for access to the Fluke Networks cloud service LinkWare Live. (DSX-602 testers have an internal Wi-Fi radio.)
10. Headset jack

Note

If you have two main testers, you can use one as a remote. To select the remote function, tap ***TOOLS > Main as Remote****.*

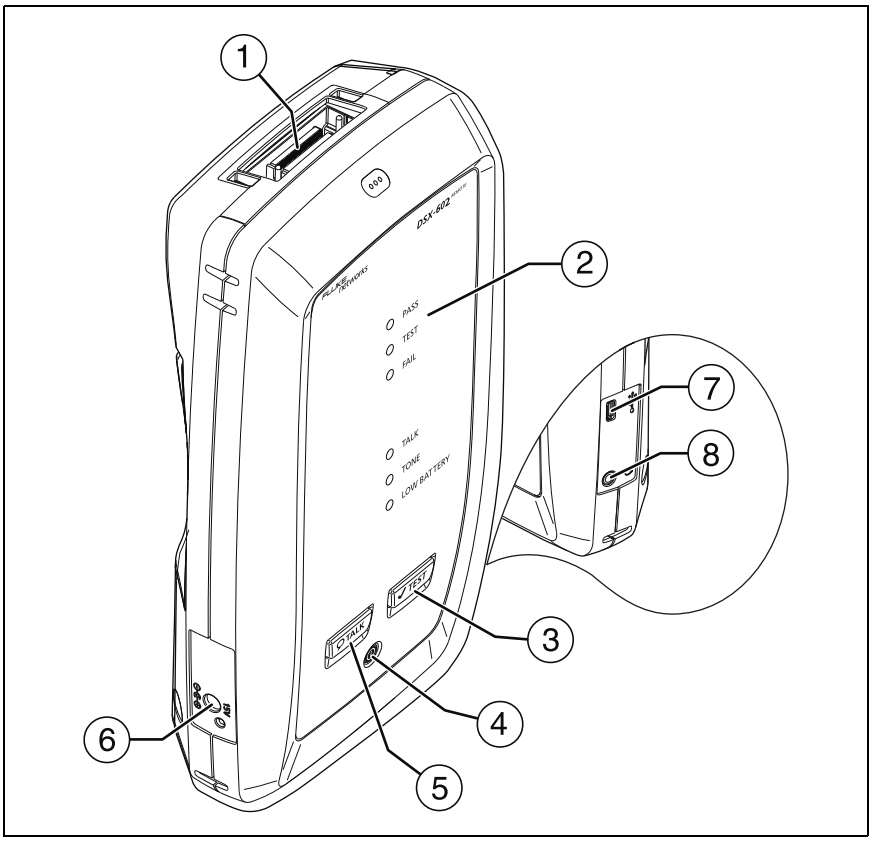


Figure 2. Remote Tester Connectors, Keys, and LEDs (DSX-602 shown)

① Connector for a link interface adapter

② **PASS** LED comes on when a test passes.

TEST LED comes on during a test.

FAIL LED comes on when a test fails.

TALK LED comes on when the talk function is on (⑤). The LED flashes until the main tester accepts the request to talk.

TONE LED flashes and the tone generator comes on if you press TEST when a main tester is not connected to the remote.

LOW BATTERY LED comes on when the battery is low.

The LEDs also have these functions:

- Battery gauge (see Figure 5 on page 15)
- Volume indicator for the **TALK** function
- Progress indicator for software updates

③ TEST: Starts a test. Turns on the tone generator if a main tester is not connected to the remote.

④ ⏻: Power key

⑤ TALK: Press TALK to use the headset to speak to the person at the other end of the link. Press again to adjust the volume. To turn off the talk function, hold down TALK.

⑥ Connector for the AC adapter. The LED is red when the battery charges, and green when the battery is fully charged. The LED is yellow if the battery will not charge. See “Charge the Battery” on page 14.

⑦ Micro-AB USB port: This USB port lets you connect the tester to a PC so you can install software updates in the tester.

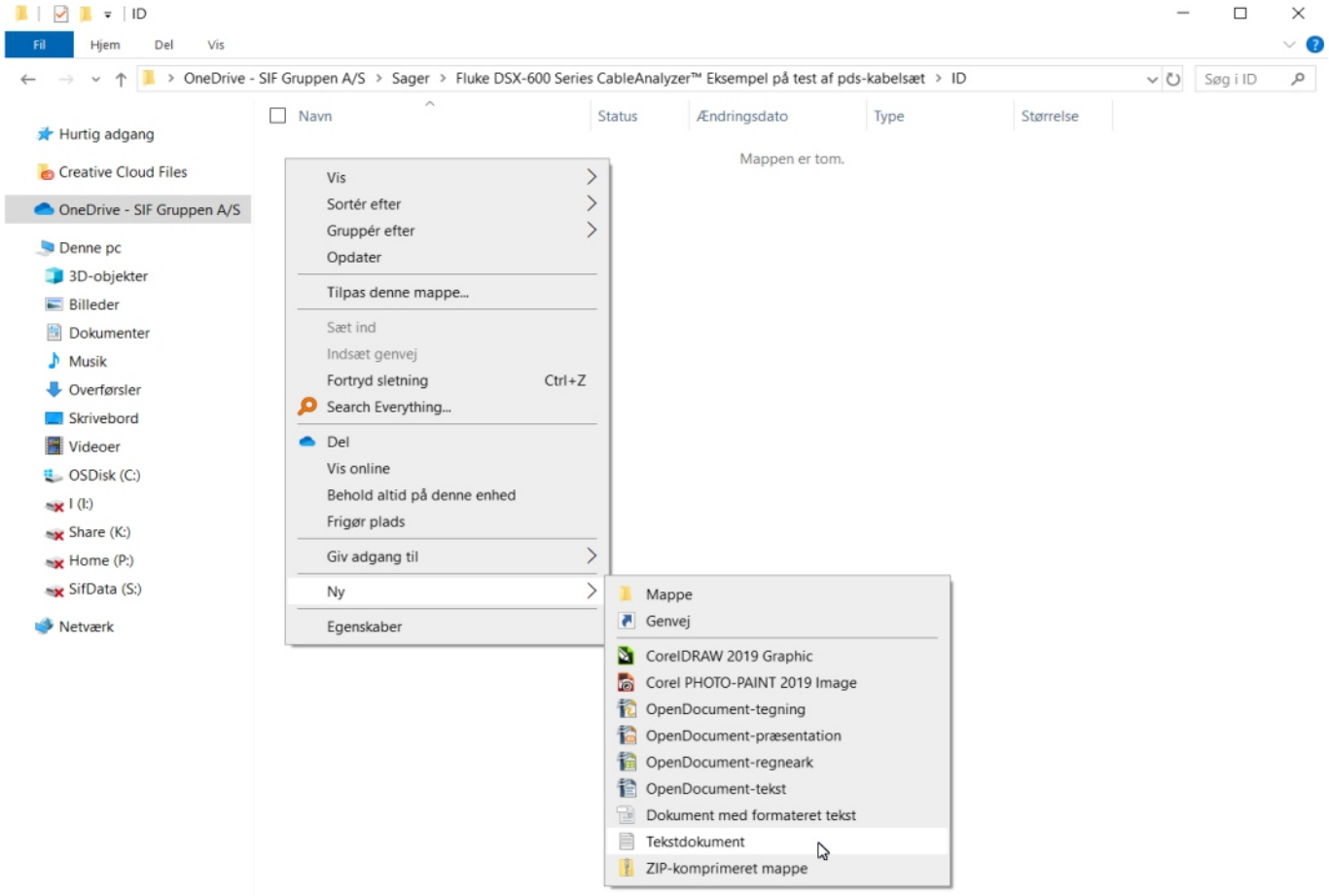
⑧ Headset jack

Opsætning af kabel-ID-liste

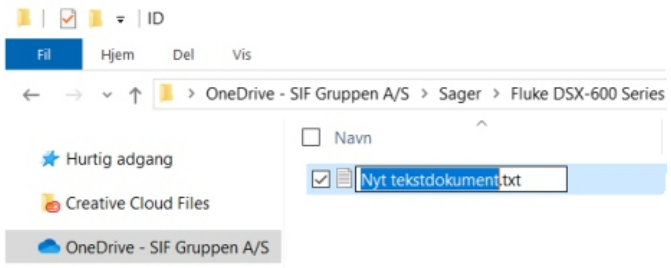
Direkte på Main Tester kan laves kabel-ID-liste (Cable ID Set).
Det vil typisk være den måde det gøres på, når der ikke skal testes så mange kabler.
Nogen foretrækker altid at gøre det på den måde.

Til dette eksempel er valgt, at overføre ID'er fra opmærkningslisten, der er lavet i Exel-regneark på pc.

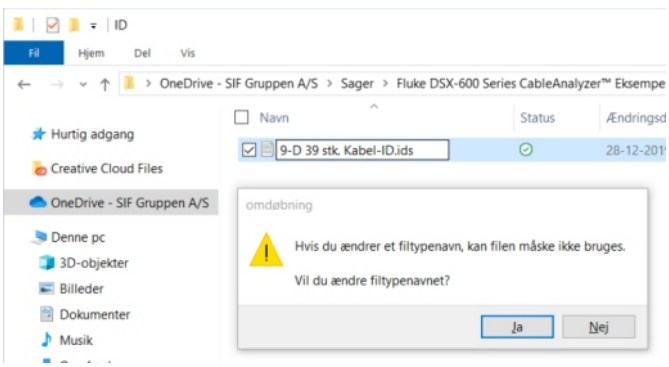
Start med at lave en filmappe og mappestruktur på din pc og navngiv den med projektets navn.
Navnet er ikke så vigtigt, bare du selv kan hitte rede i det.
I den mappe laves et txt-dokument.
Åben mappen, højreklik i den, og nedenstående menu kommer frem.
Klik [Ny] → [Tekstdokument]



Navngiv nu txt-filen med et passende navn.
Det vigtigste er, at file extension er *.ids*
Her er navnet: *9-D 39 stk. Kabel-ID.ids*



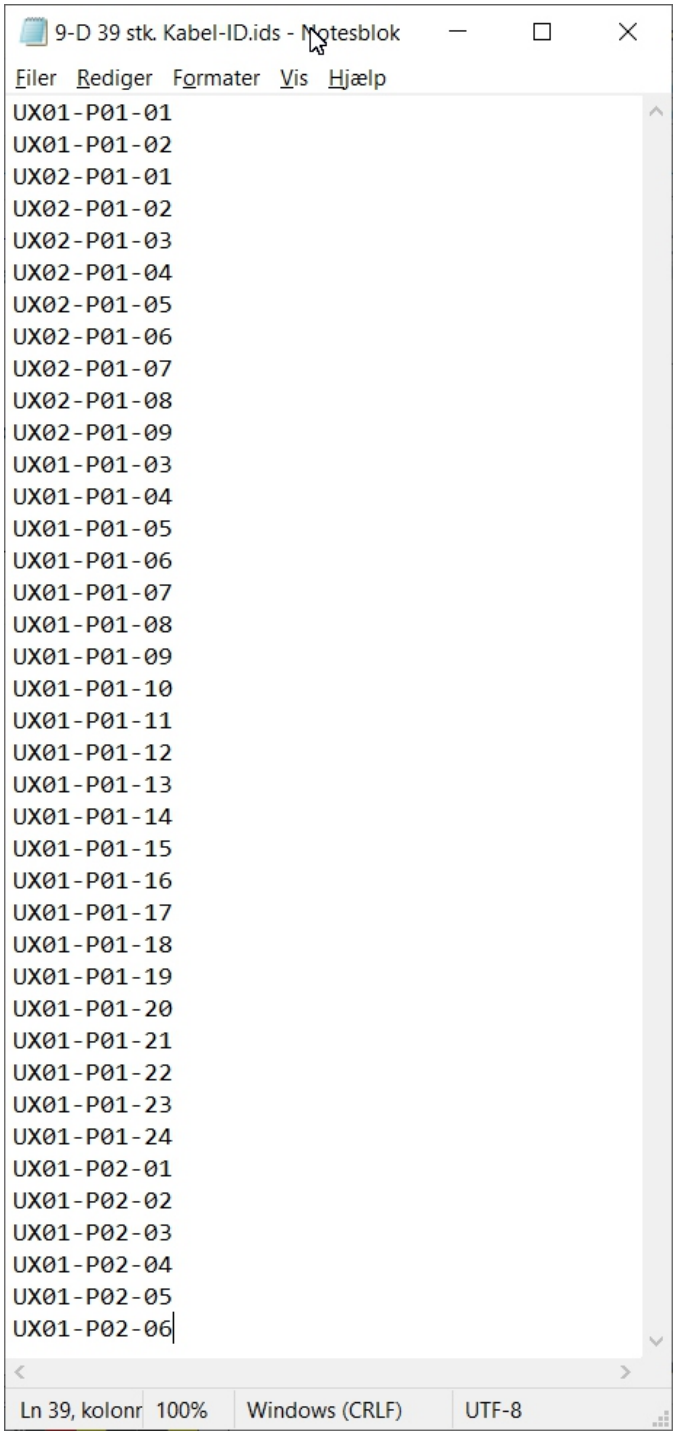
Du skal således klikke [Ja], til at ændre filtypenavnet.

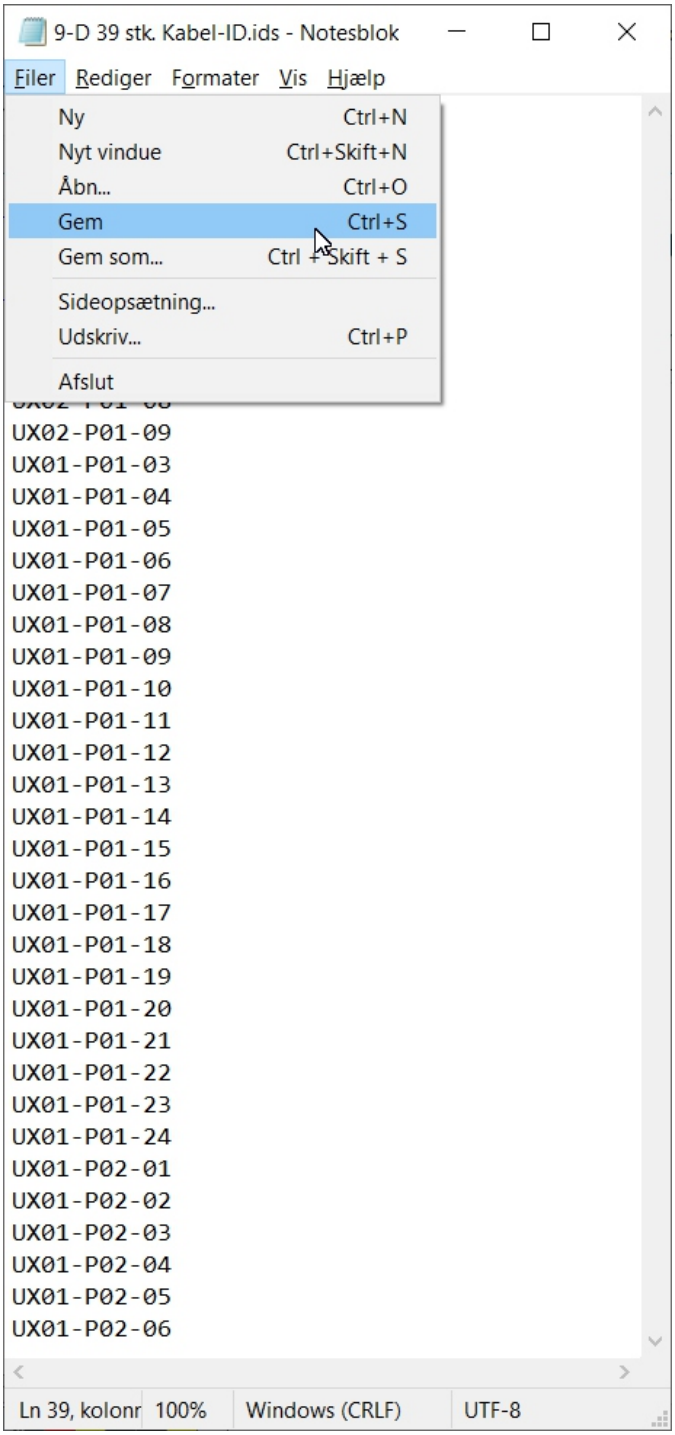


Opsætning af kabel-ID-liste

Kopier nu kolonnen med kabel-IDer fra Excel-regnearket.
(Det er kolonnen: [Opmærkning i Rack]), sæt den ind i txt-filen og gem.

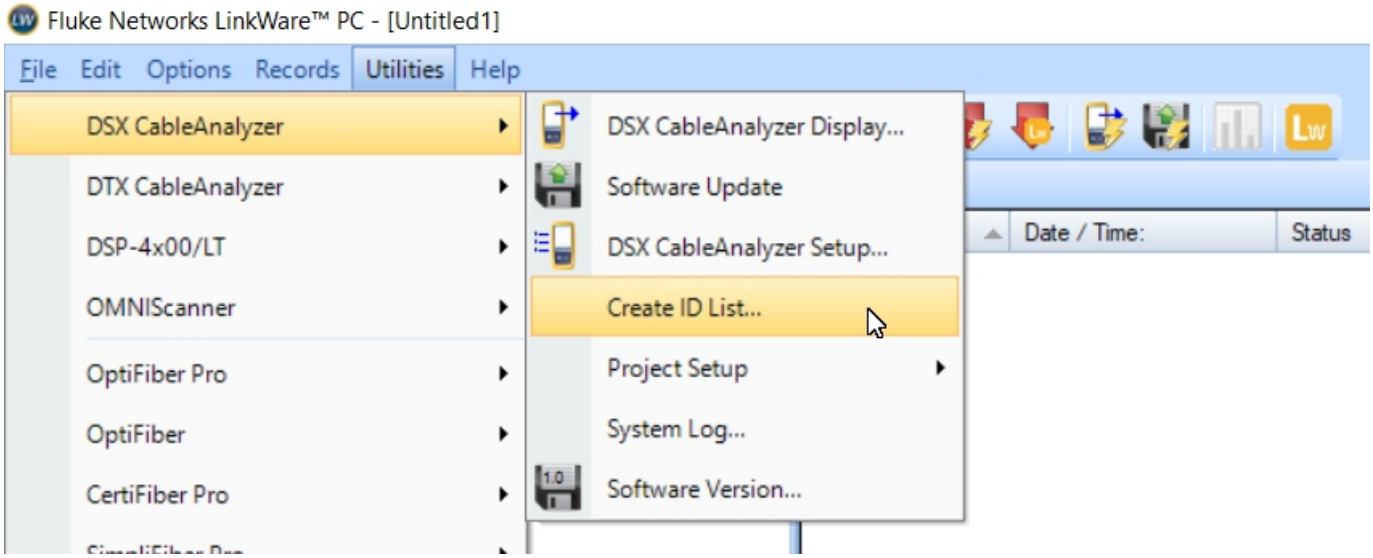
[Filer] → Gem]



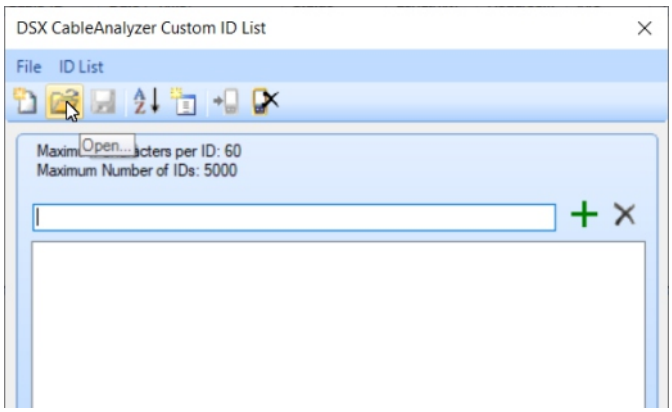


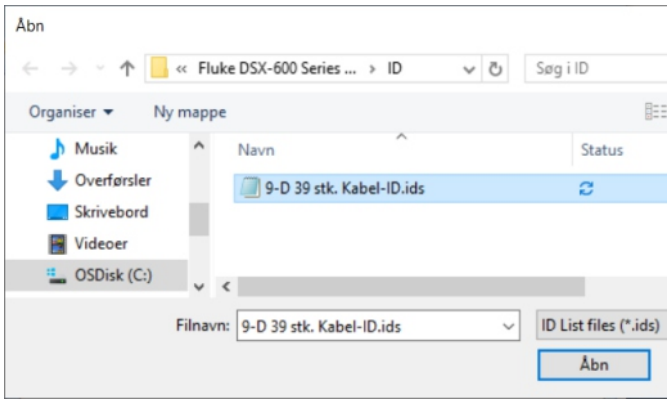
Kabel-ID-liste *Fluke Networks LinkWare™ PC*

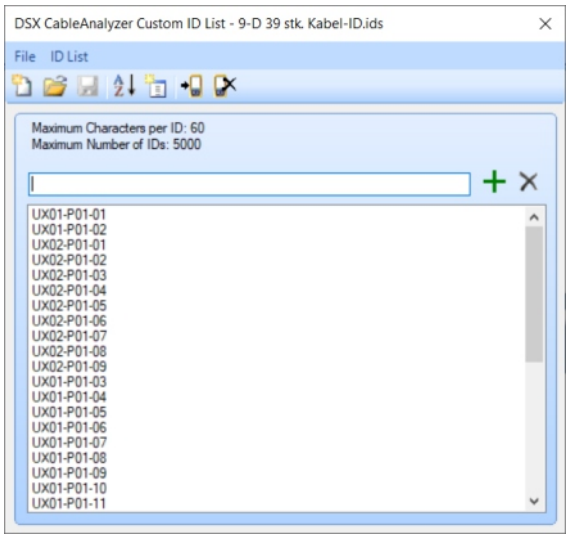
Start nu computerprogrammet *Fluke Networks LinkWare™ PC* (Se side 35 i dette dokument).
Klik [Utilities] → [DSX CableAnalyzer] → [Create ID list...]



Klik på ikonet [Open] og find via stifinder den *ids-fil*, du lige har lavet, og klik [Åbn]

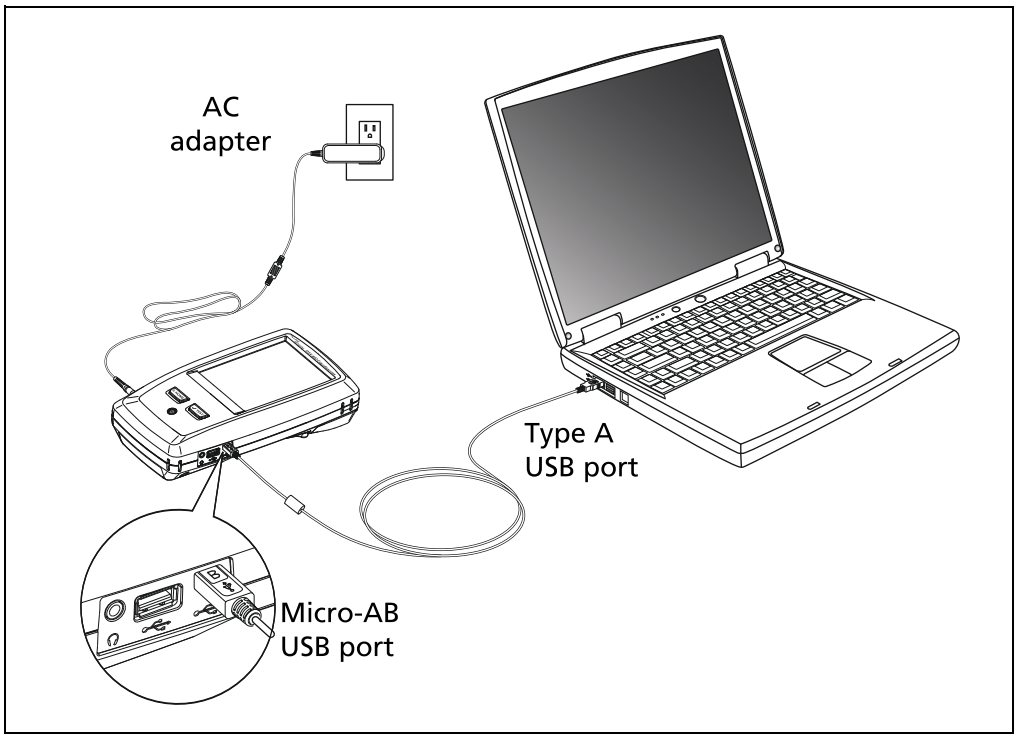






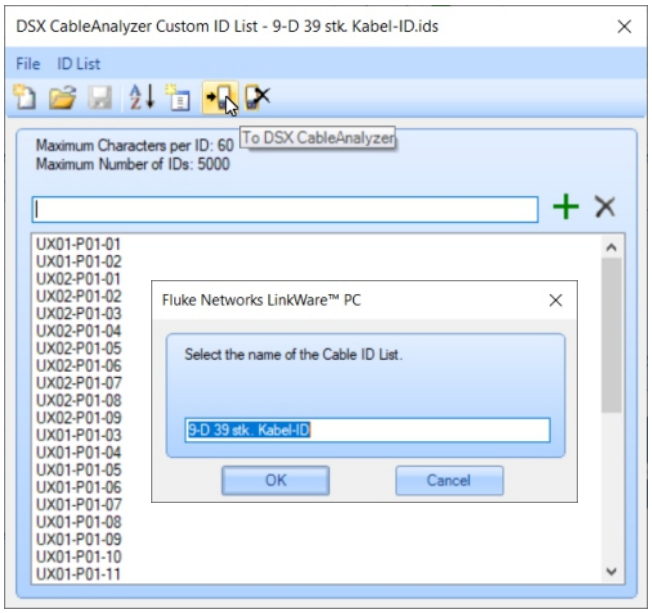
Kabel-ID-liste *Fluke Networks LinkWare™ PC*

Tænd nu DSX-600 MainTester og forbind den til pc med USB-kabel.

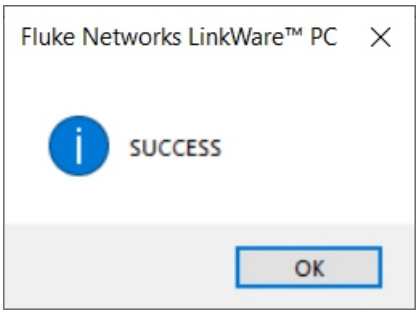


BK46.EPS

Klik nu på ikonet [To DSX CableAnalyzer] og derefter på [OK]



Klik [OK] og ID-listen er nu overført til testeren.



Opsætning af Main Tester

Kategorier - Kabeltyper - Teststandarder - Montering A eller B

Kategorier og kabeltyper

Kategori 5:	ISO11801	Class D (1995)
Kategori 5e:	EN50173	Class D
Kategori 6:	EN50173	Class E
Kategori 6a:	EN50173 PL2	Class Ea (Ved normal installation i 2 konnektorer) Bruges med konnektorer mærket med “ISO CAT6A”
Kategori 6a:	EN50173 Channel	Class Ea Bruges med konnektorer, som er 10GB godkendt, men uden “ISO”-mærkat. Linket skal testes med patchkabler af samme fabrikat som resten af installationen. Patchkabler gemmes.
Kategori 7a:	EN50173 PL2	Class Fa

Ved kategori 6a-installationer, der er under 15 mtr., bruges ISO11801 PL2 Class Fa Low II eller ISO11801 channel Class Ea Low II.

Kategori	Data rate	Båndbredde	Class
Cat3	10 MBit	16 MHz	Class C
Cat6	1 GBit	100 MHz	Class D
Cat6	1 GBit	250 MHz	Class E
Cat7	1 GBit	600 MHz	Class F
Cat6A	10 GBit	500 MHz	Class EA
Cat7A	10 GBit	1000 MHz	Class FA

Det er vigtigt, at alle relevante indstillinger er korrekte.

- **Cable Type**
  Til dette eksempel er brugt:
  Schneider Electric Actassi CL-MXC6A **VDICD68Xxxx Series Cat6A** 100Ω 550MHz F/FTP LSZH Euroclass Dca s2diai **NVP 82%** ISO/IEC 11801 Ed 2.2 ANATEL 3894-15-6206 EC VERIFIED FY2119 OF 106958730

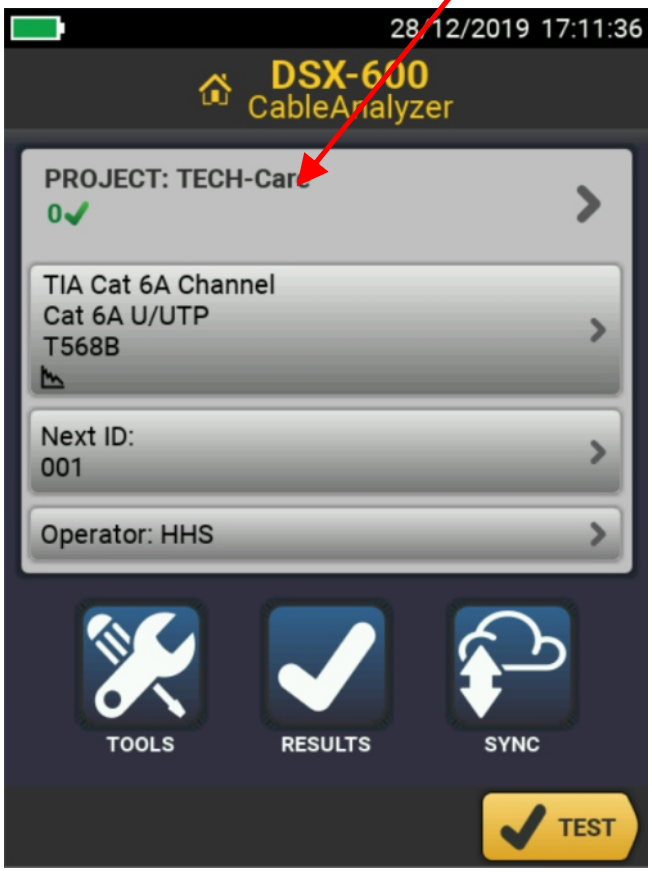
- **Test Limit**
  Til denne test er valgt **permanent link (PL)**. **EN50173 PL2 Class Ea**
  Derfor er der anvendt *PERMANENT LINK ADAPTER.*

- **Outlet Configuration**
  Der er 2 muligheder: T568**A** eller T568**B.**
  I dette eksempel er anvendt T568**B**.
  (Det henviser til, hvordan kablet monteres i konnektorer.)

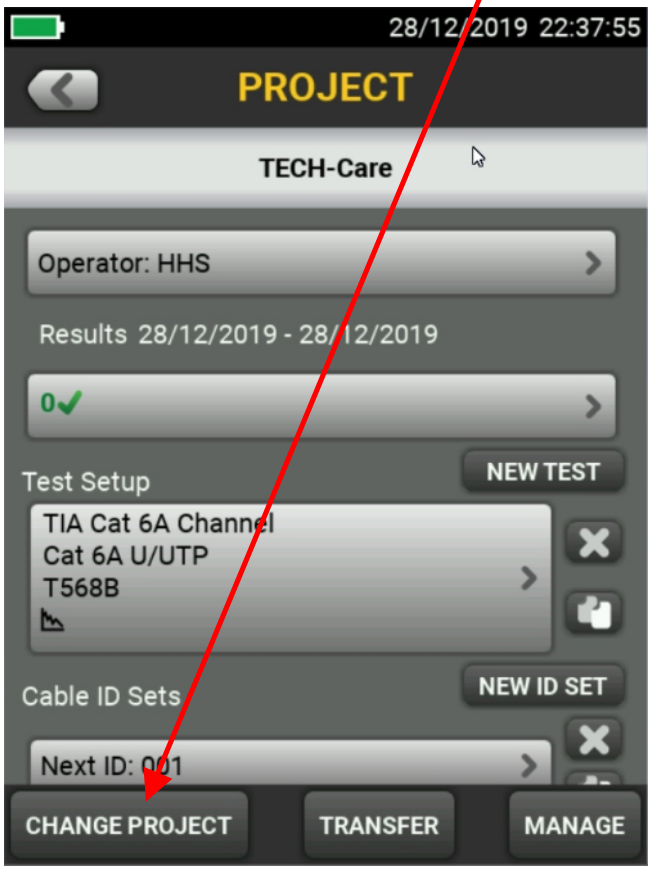
Opsætning af Main Tester

Projektnavn

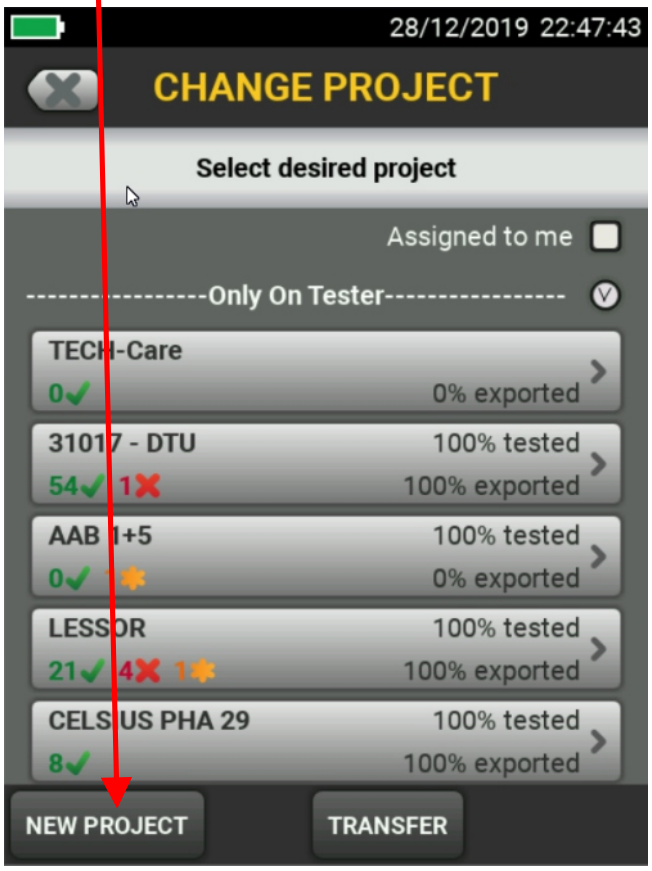
Tænd Main Tester. Den starter op med Home Screen og viser sidste test. Tryk her.



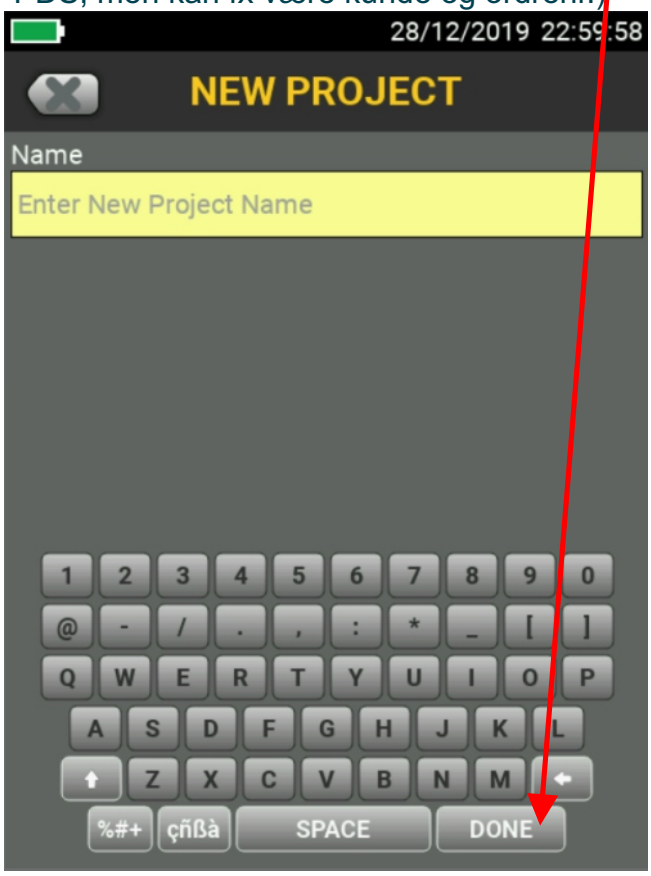
For at sætte et nyt projekt op tryk her.



Tryk her for at lave nyt projekt.



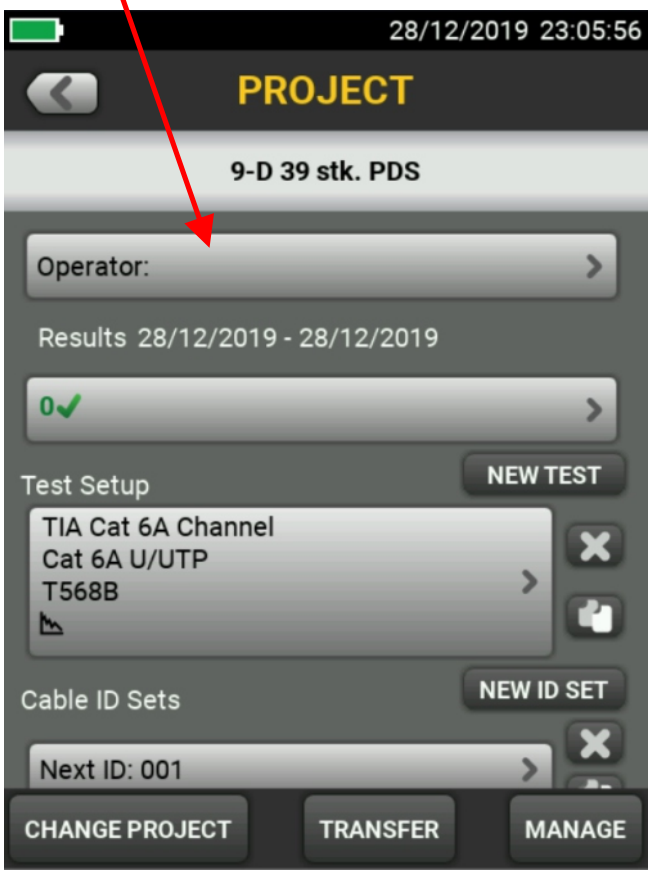
Giv projektet et passende navn og tryk her.
(I eksemplet her er navnet 9-D 39 stk.
PDS, men kan fx være kunde og ordrenr.)



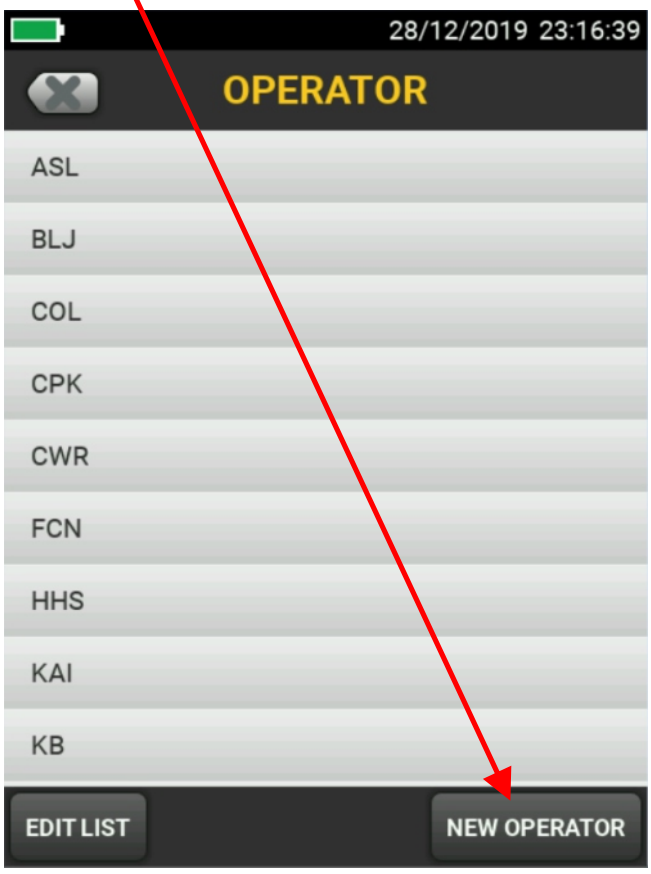
Opsætning af Main Tester

Oprettelse af operatør

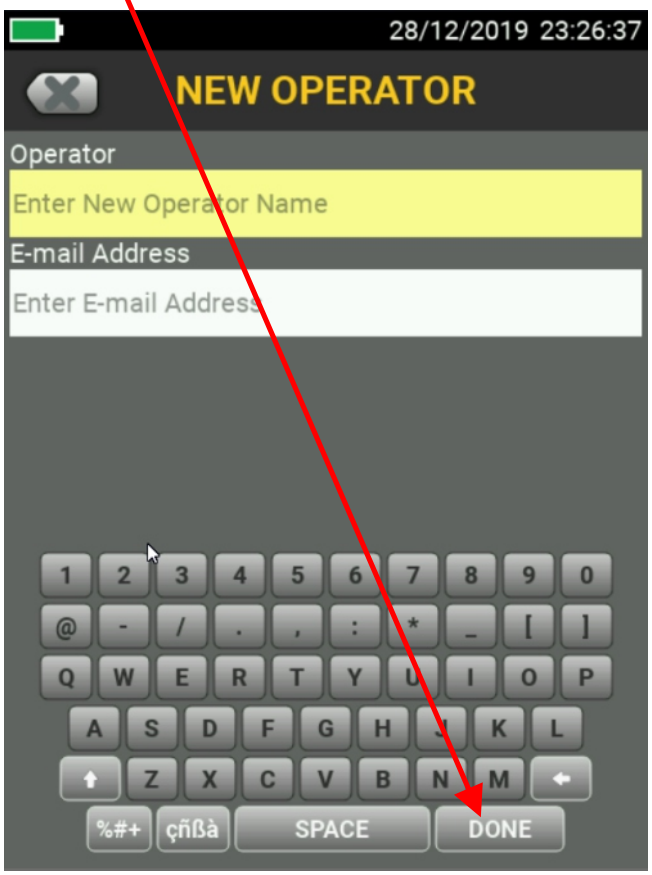
Tryk her for at ændre operatør.



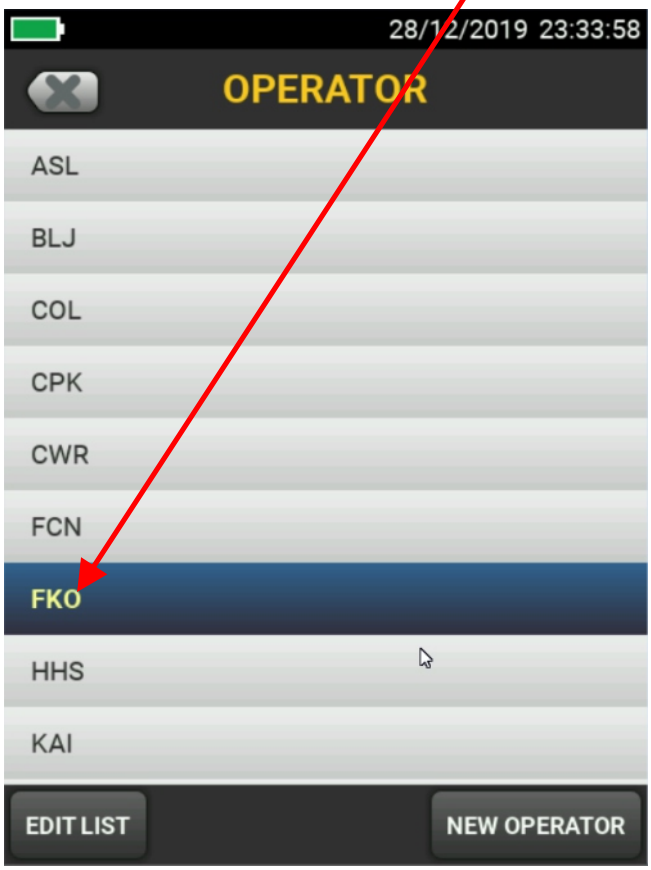
Tryk her for at oprette dig som operatør.



Indtast dine initialer og e-mail-adresse og Tryk her.



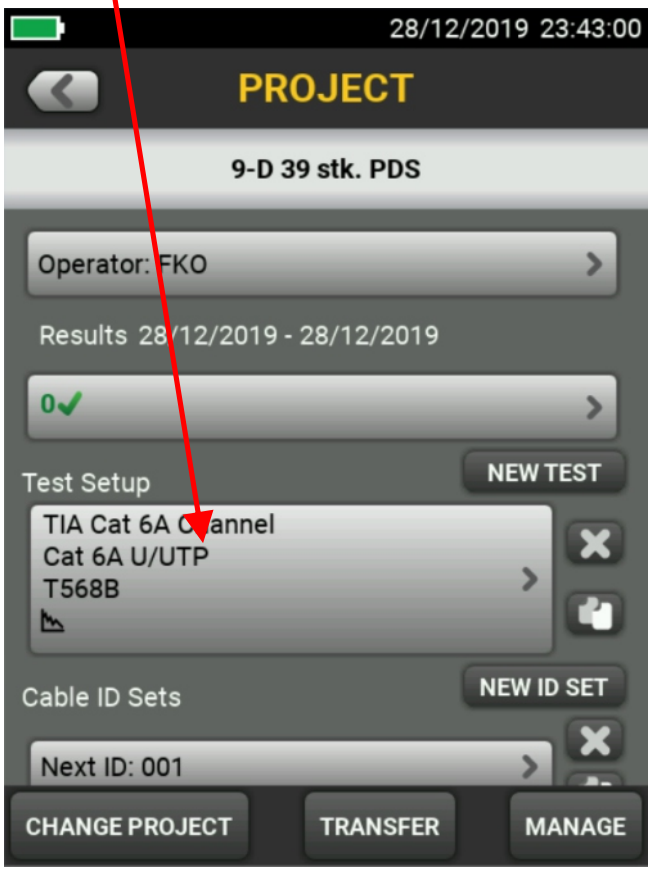
Tryk på de initialer du lige har oprettet.



Opsætning af Main Tester

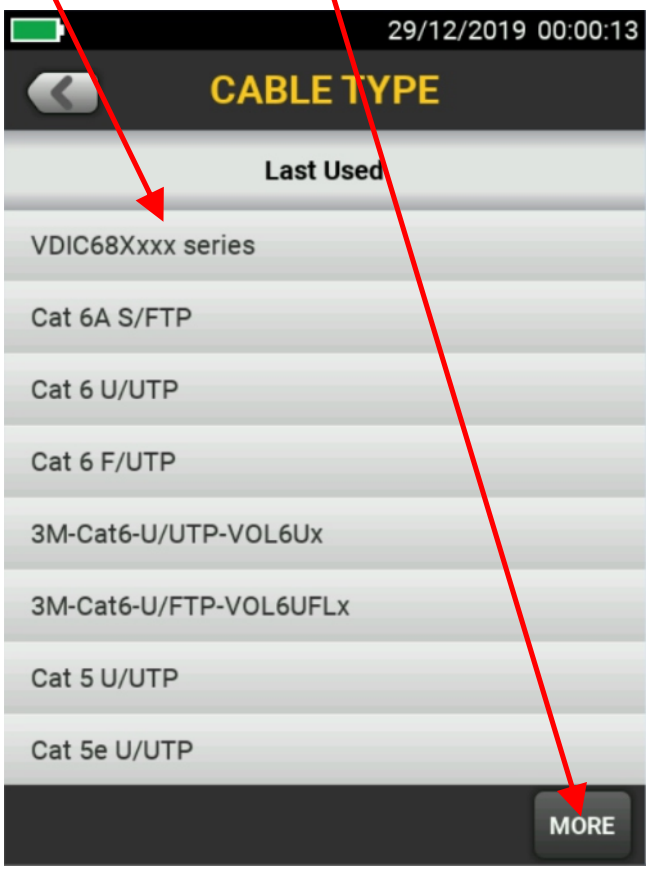
Test Setup - Kabeltype

Tryk her for at ændre aktuelt Test Setup.

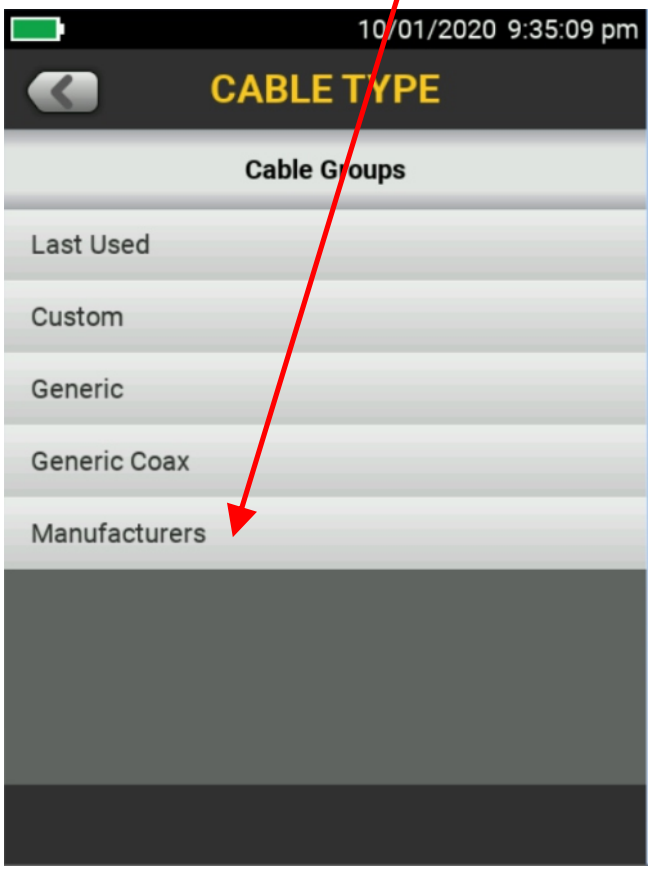


Tryk her for at ændre til korrekt kabel.
Kablet i dette eksempel er:
VDIC68Xxxx Series (Cat6A)

Hvis kablet fremgår af listen, kan det vælges her. Ellers trykkes her.



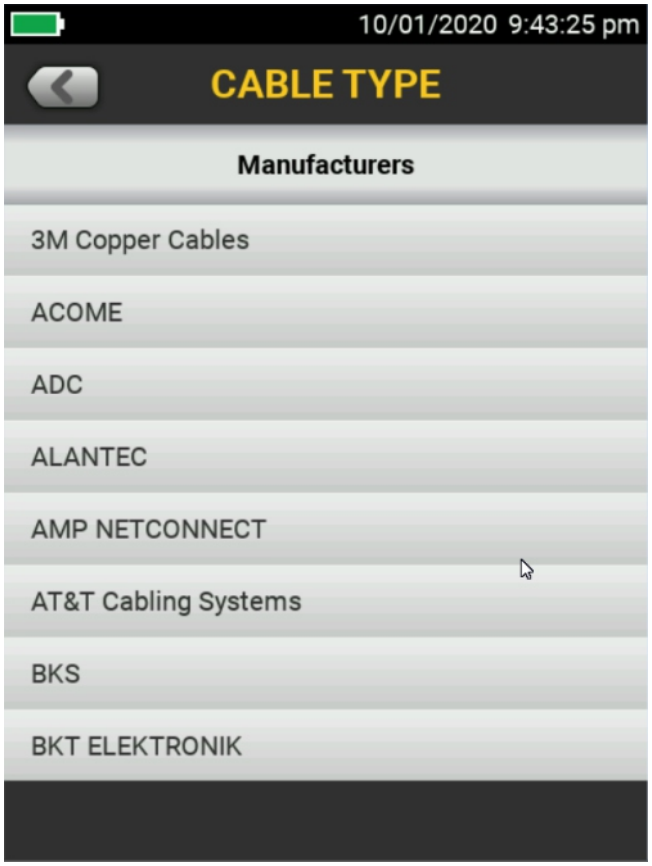
Her er forskellige valgmuligheder.
Til eksemplet er valgt Manufacturers



Opsætning af Main Tester

Test Setup - Kabeltype - Teststandard/Test Limit

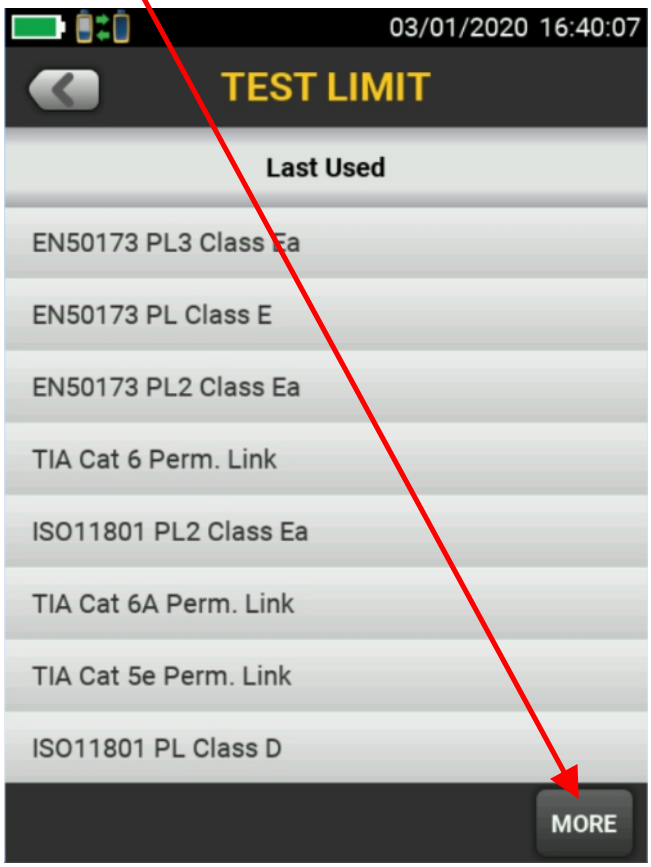
Her kan du scrolle ned til aktuel kabelproducent. (Schneider Electric.)
Gøres ved at stryge fingeren på skærmen.



Her kan du scrolle ned til aktuelt kabel.
VDIC68Xxxx series
Tryk her

Tjek, at NVP-værdien er ok. Ellers kan den ændres ved at trykke her.
Tryk her for at ændre aktuelt Test Limit.

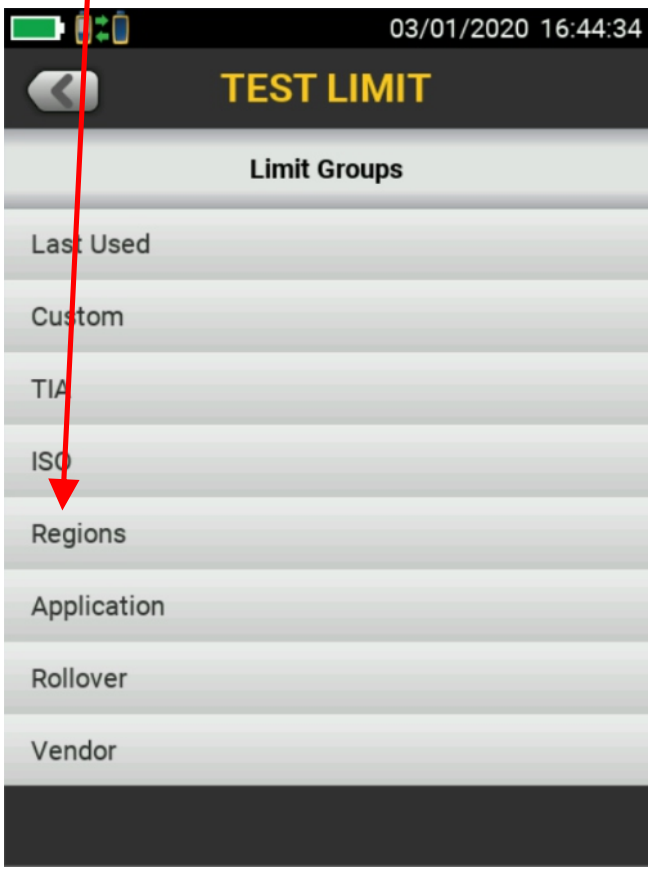
Tryk her for at få flere muligheder.



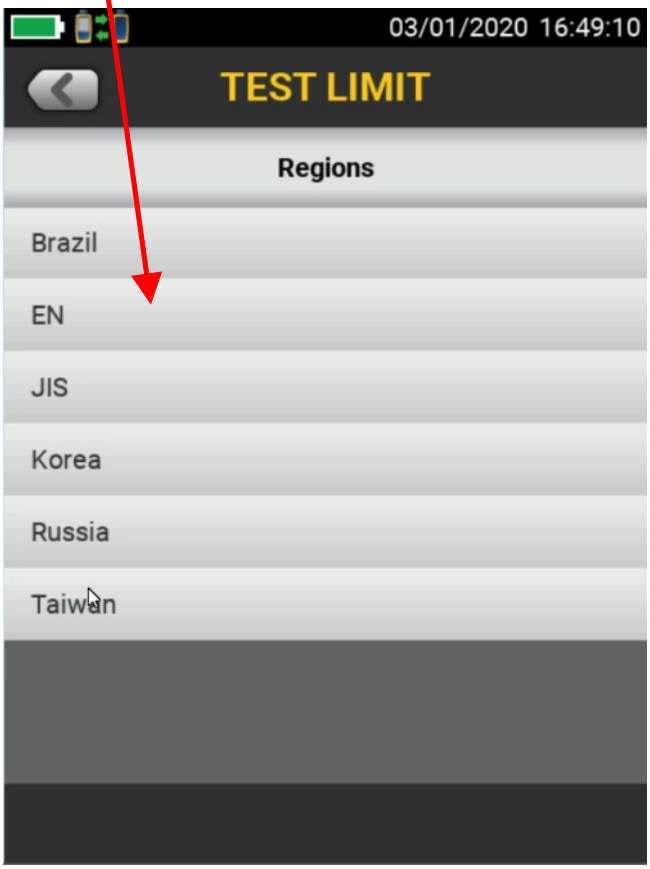
Opsætning af Main Tester

Test Setup - Teststandard/Test Limit - Montering A eller B

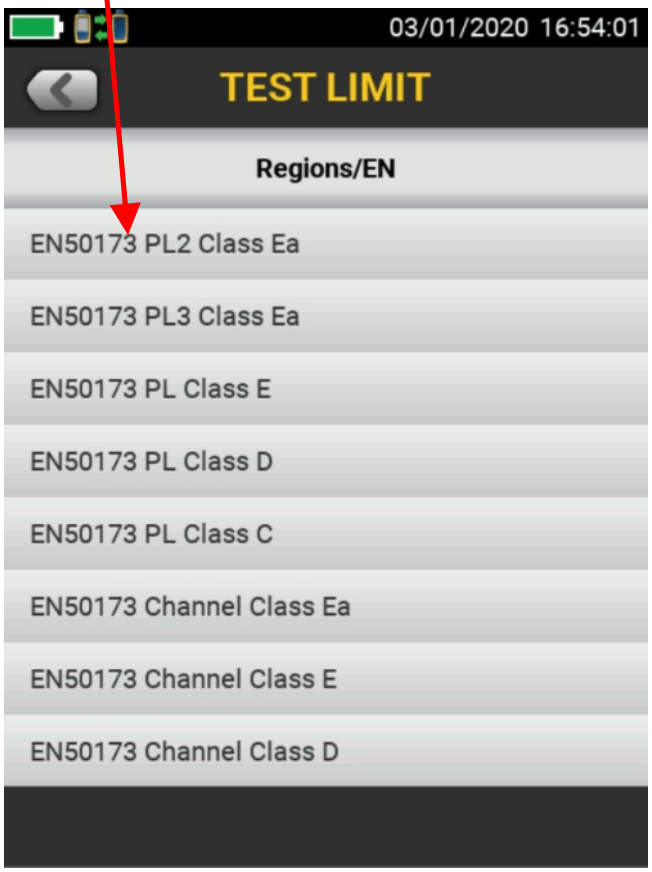
Tryk her for at nå den rigtige region.



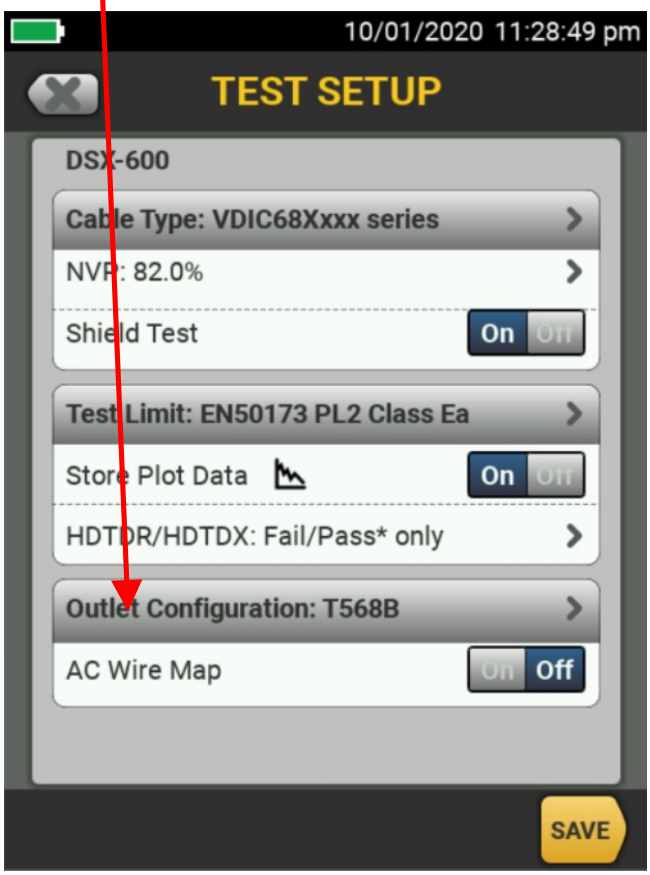
Tryk her for at nå EN50173



Tryk her for at vælge EN50173 PL2 Class Ea.



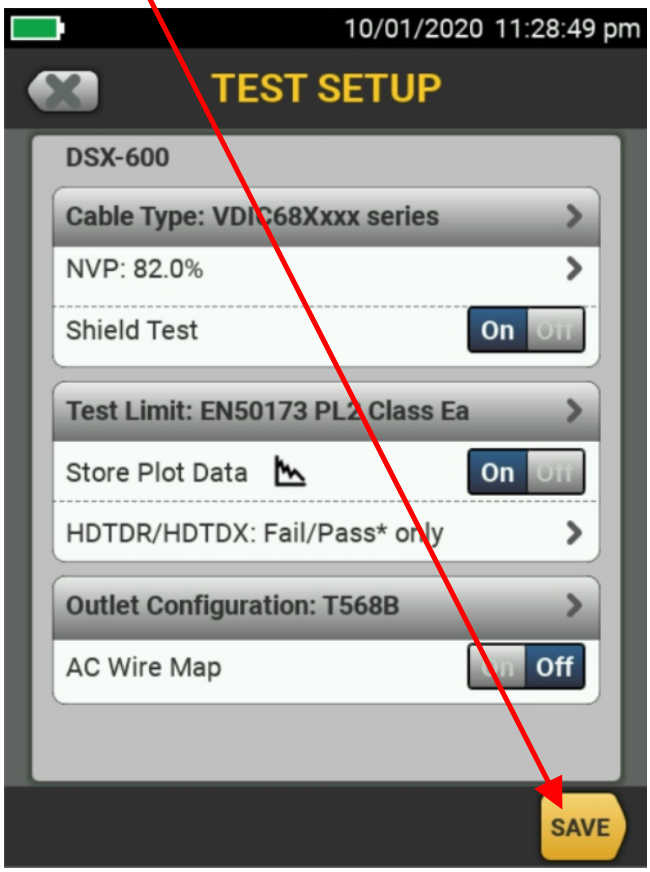
Tryk her for at vælge om konnektorer er monteret som A eller B.



Opsætning af Main Tester

Opsætning af Cable ID set/Kabel-ID-liste

Tryk her for at gemme TEST SETUP



Næste punkt er opsætning af Cable ID set.
Du kan fx vælge default Next ID: 001
og ændre det efter ønske.

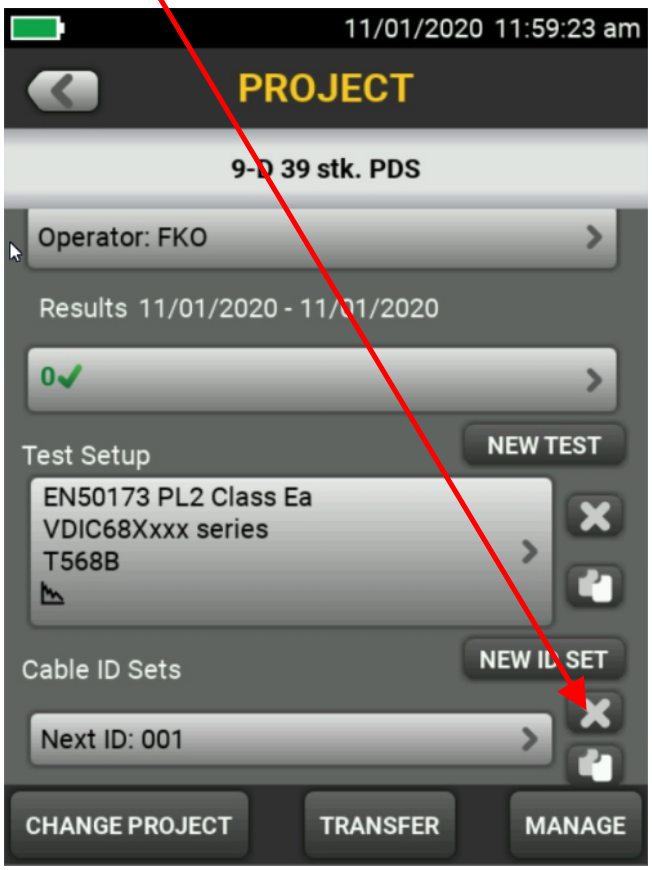
Testeren vil forøge ID med en efter hver test.
Det vil typisk være den metode, der bruges ved et mindre antal kabler, der skal testes.

Du kan også oprette et nyt, [NEW ID SET],
og ændre det efter ønske.

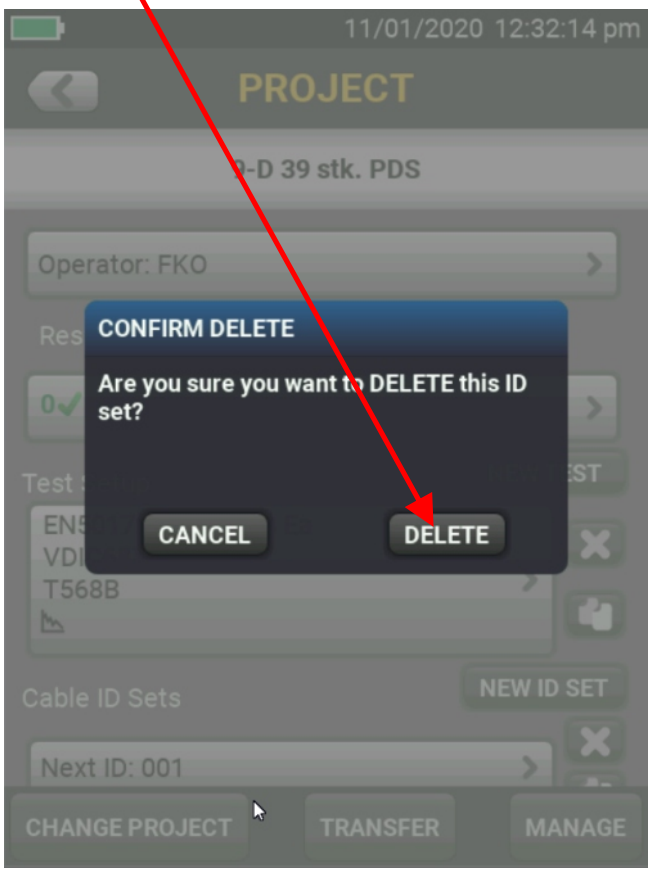
Til dette eksempel er valgt, at importere ID'er fra Excel regneark, lavet på pc.
Som vist tidligere, er denne kabel-ID-liste allerede overført til Main Tester, og vi skal nu have den importeret.

Dog startes med at slette default ID Set for at give bedre overblik.
Dette er ikke absolut nødvendigt, men kan gøres, eller ikke gøres, alt efter dit temperament.

Tryk her for at slette default ID set



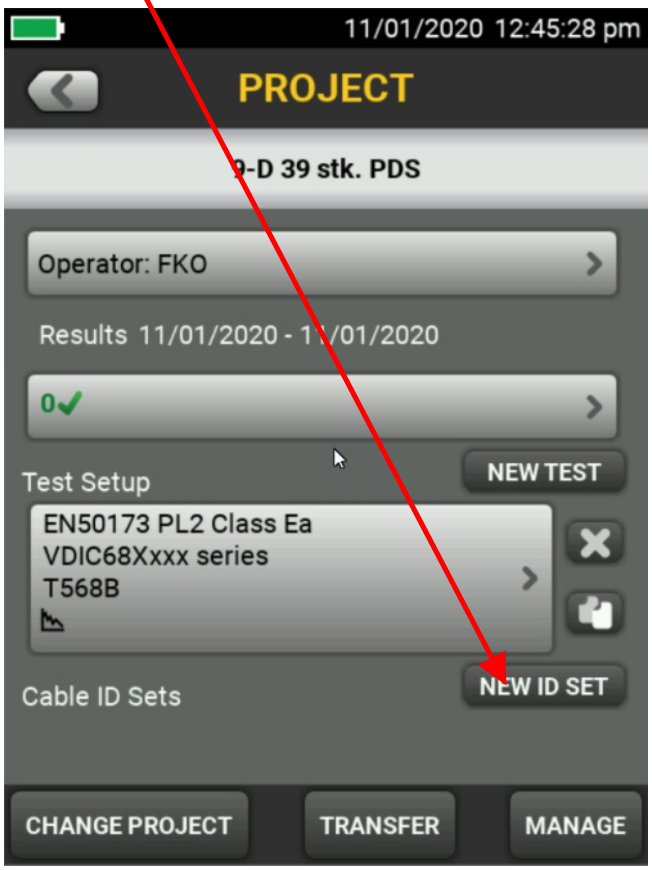
Tryk her for at bekræfte sletning.



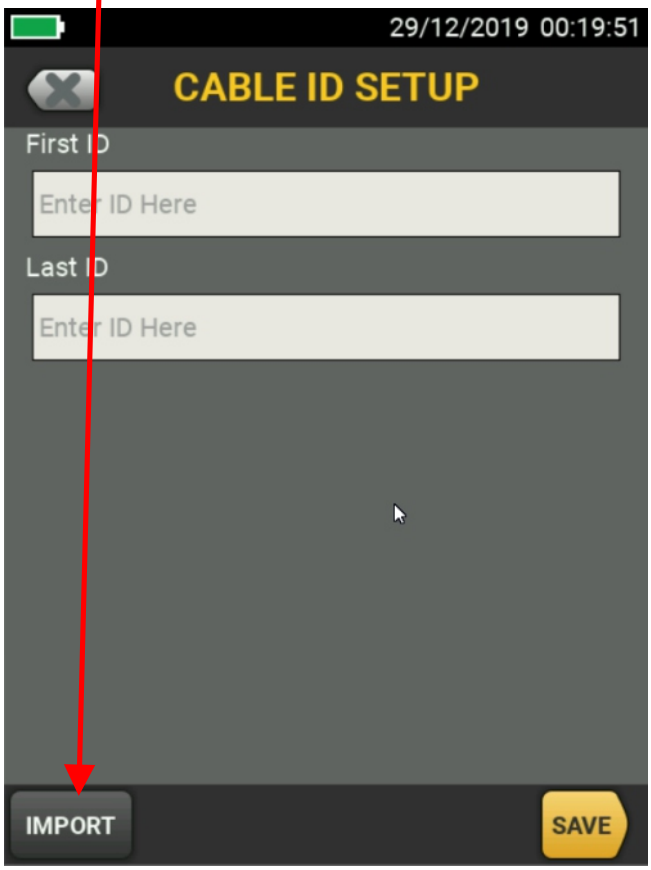
Opsætning af Main Tester

Opsætning af Cable ID set/Kabel-ID-liste

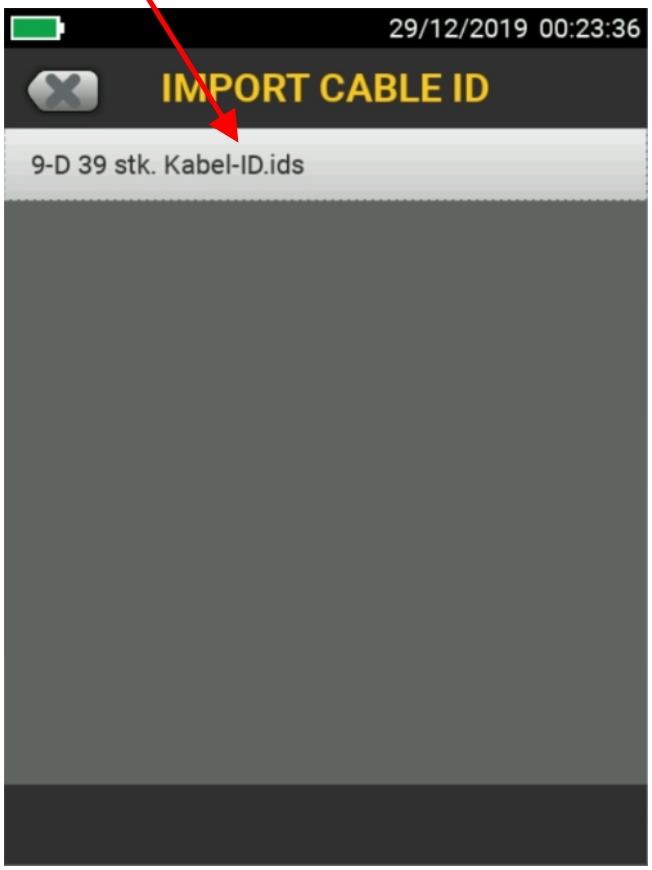
Tryk her for at oprette nyt ID SET



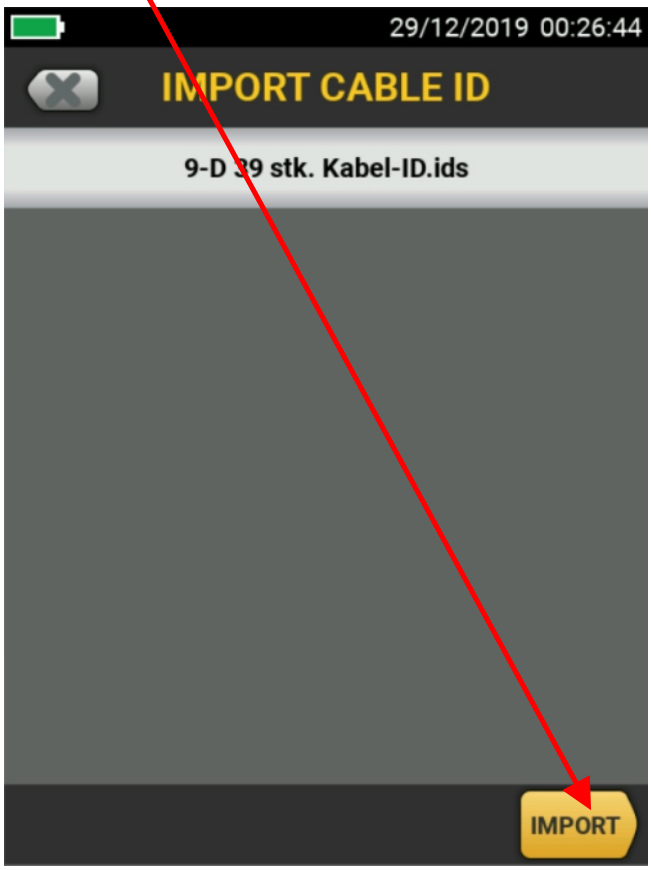
Tryk her for at importere ID SET.



Tryk her for at vælge det ID SET vi har lavet på pc.



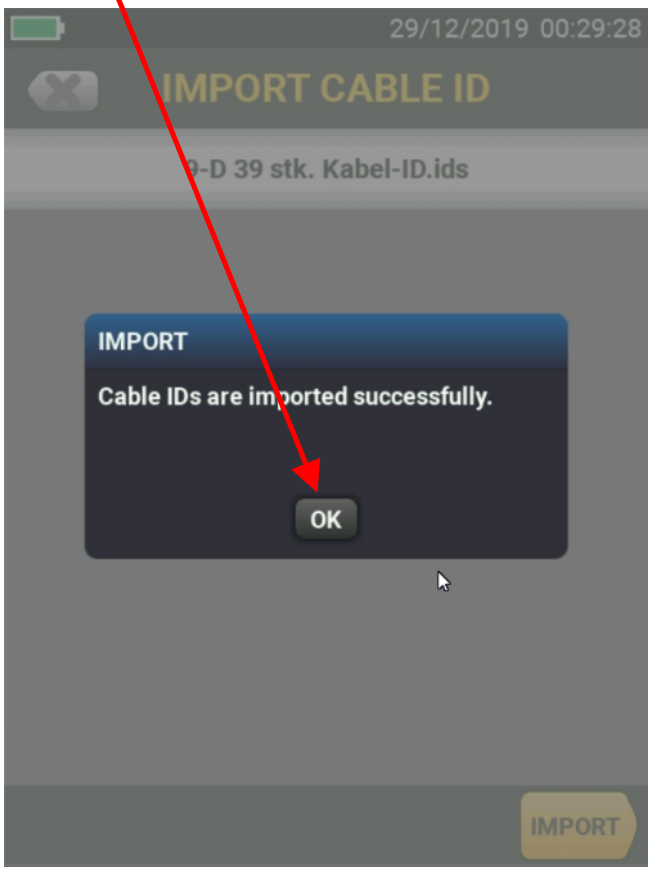
Tryk her for at importere ID SET.



Opsætning af Main Tester

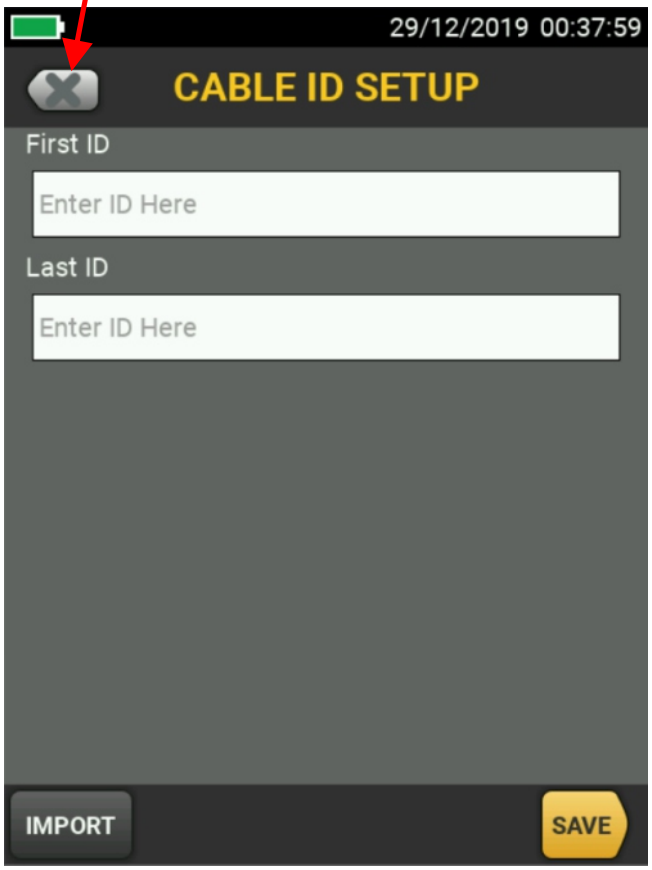
Opsætning af Cable ID set/Kabel-ID-liste

Tryk OK her.

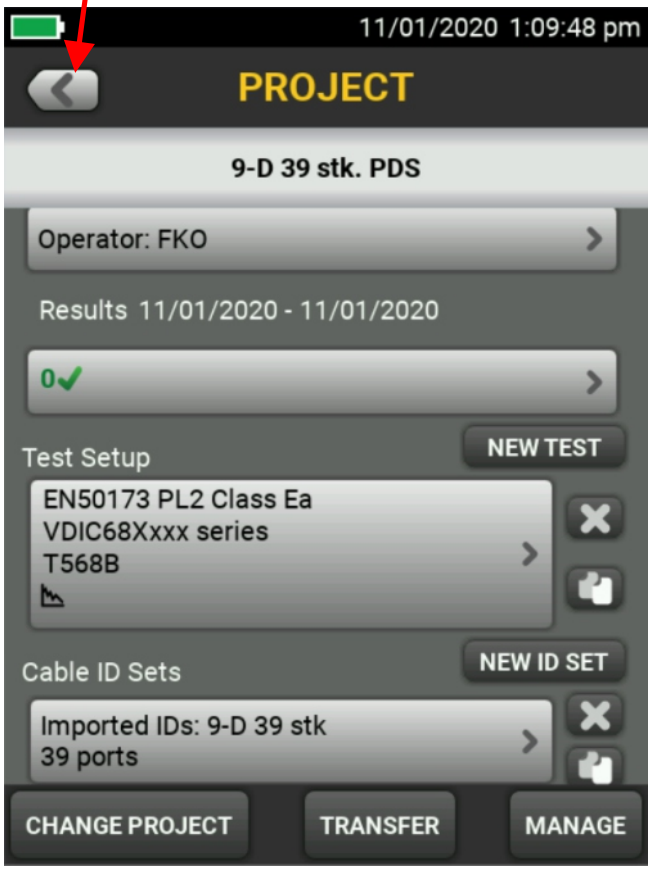


Tryk her for at komme videre.

Tryk her for at komme videre.

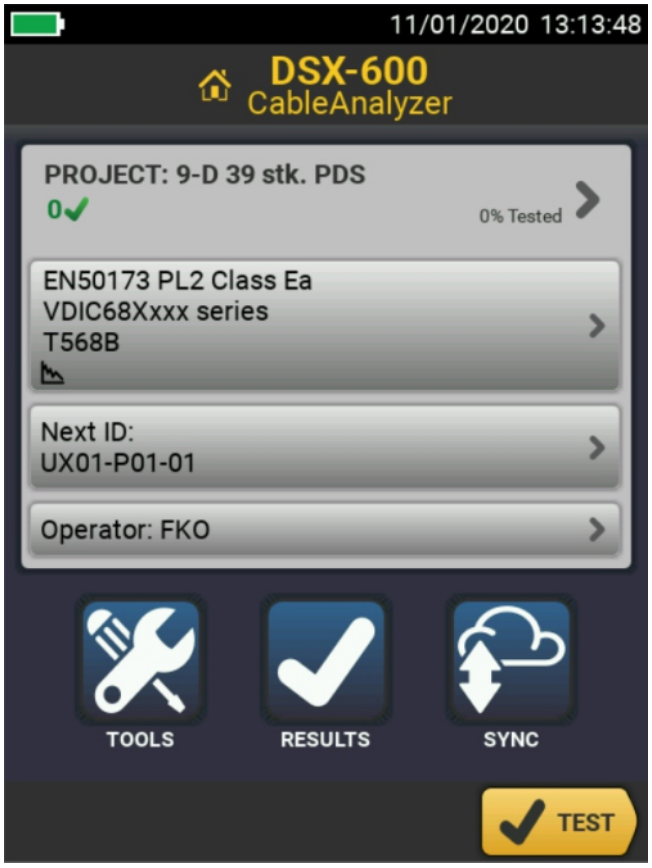


Tryk her for at komme til [Home Screen]

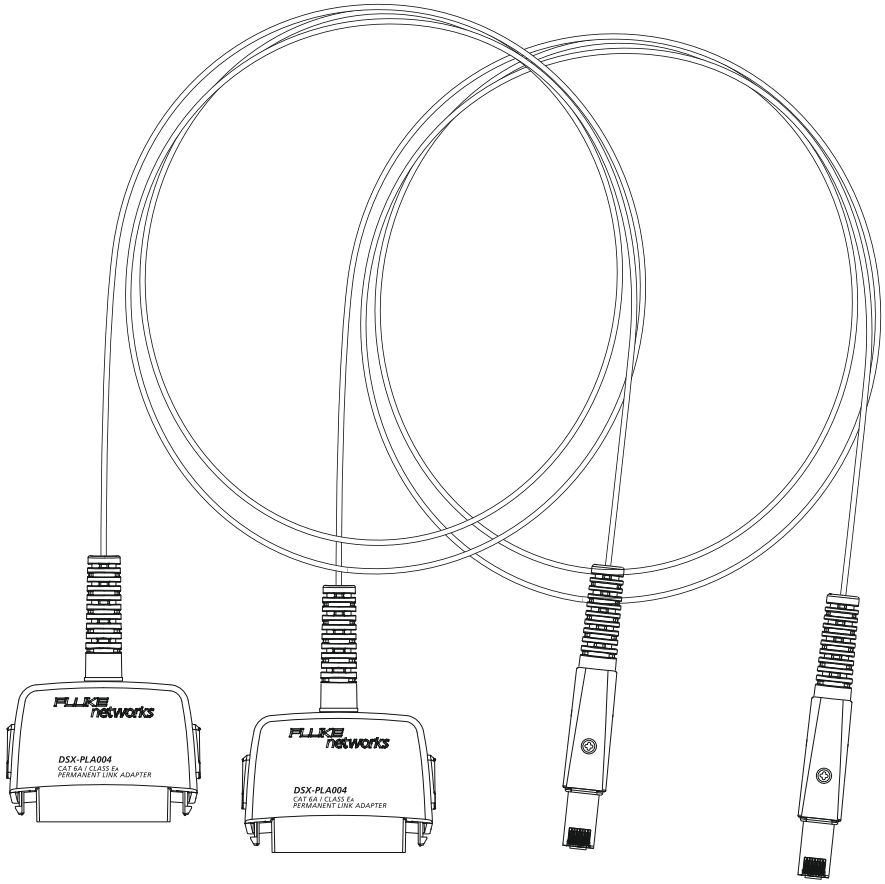


Opsætning af Main Tester

Nu er Main Tester sat op og klar til test.



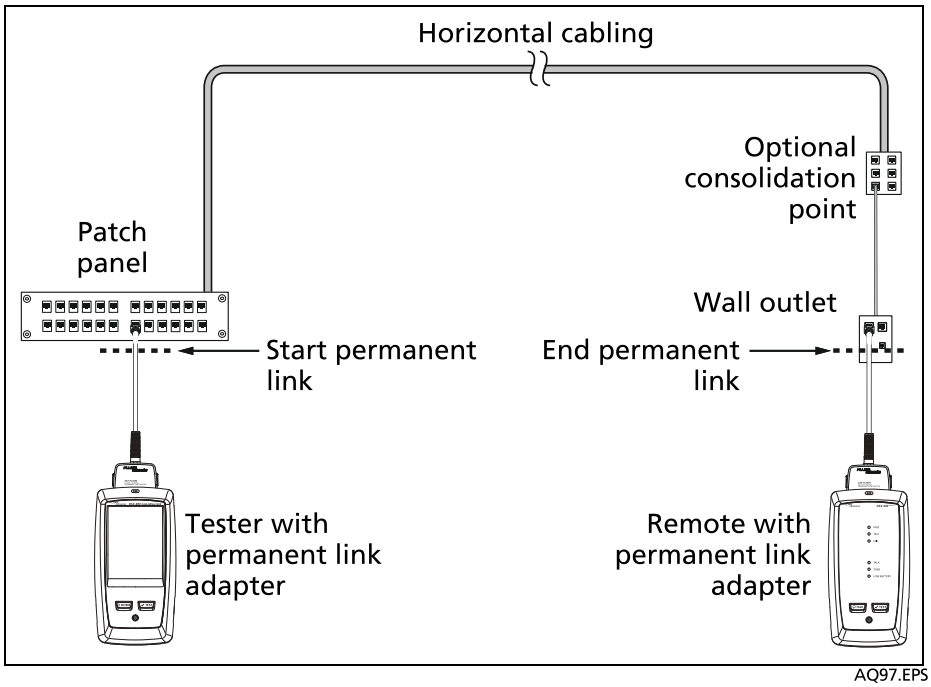
PERMANENT LINK ADAPTER



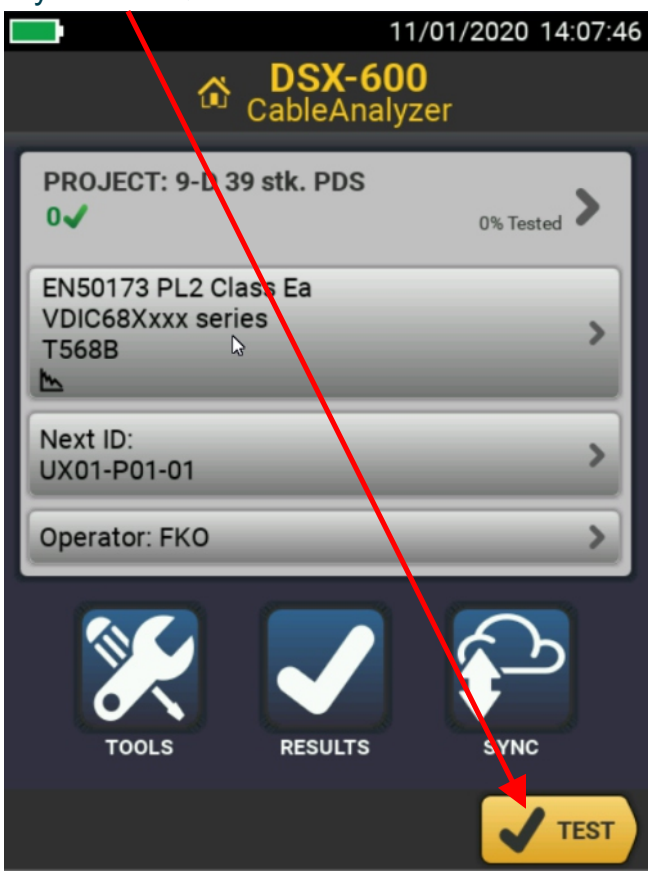
Test af kabelsæt

Mindst en gang om måneden skal udføres [SET REFERENCE].
Hvis høj kvalitet kræves, udføres det en gang om dagen.
Inden operationen udføres, skal testerne have været tændt i minimum 5 minutter, og testerne skal have rumtemperatur. (10-40°C).
Fra [Home Screen] vælges [TOOLS] → [Set Reference] og følg instruktion på skærmen.
Ellers se i *"DSX-600 Series CableAnalyze Users Manual"*. (Side 33 i dette dokument).

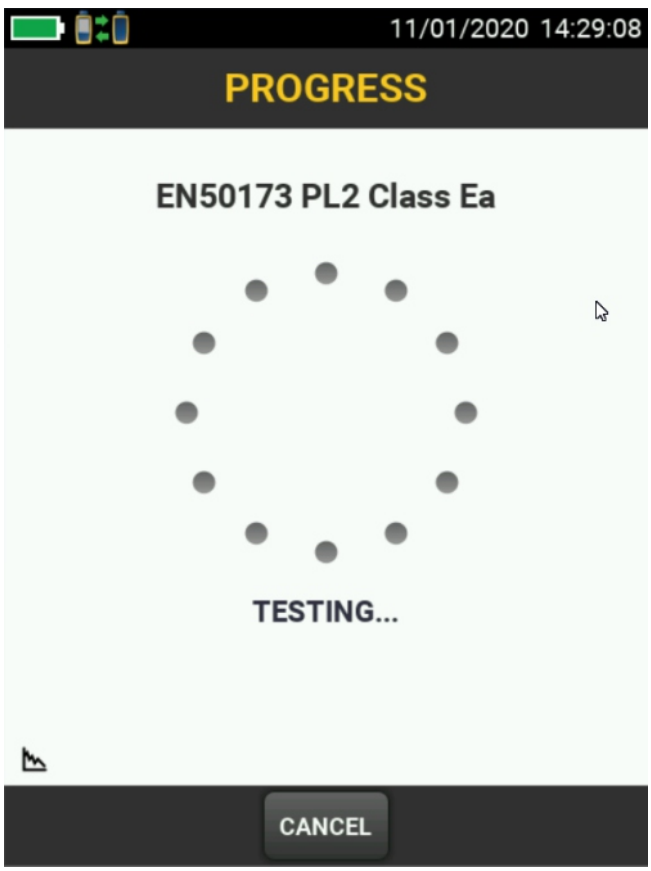
Forbind nu Main Tester og Remote Tester som nedenstående, og tænd begge.



Inden start. Vær opmærksom på, om alle teststparametre er korrekte.
Tryk her for første test.

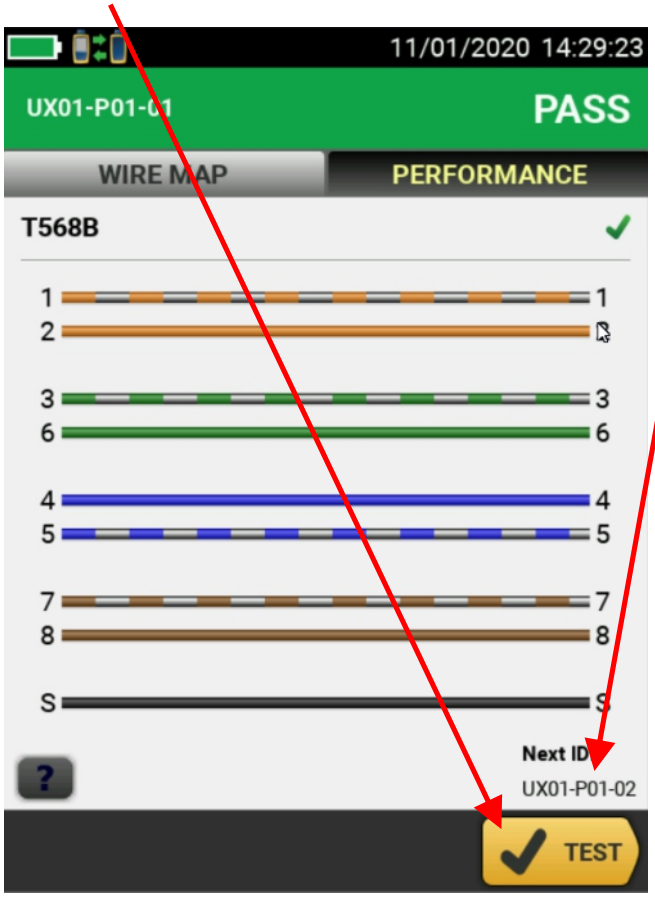


Første test er nu igang.

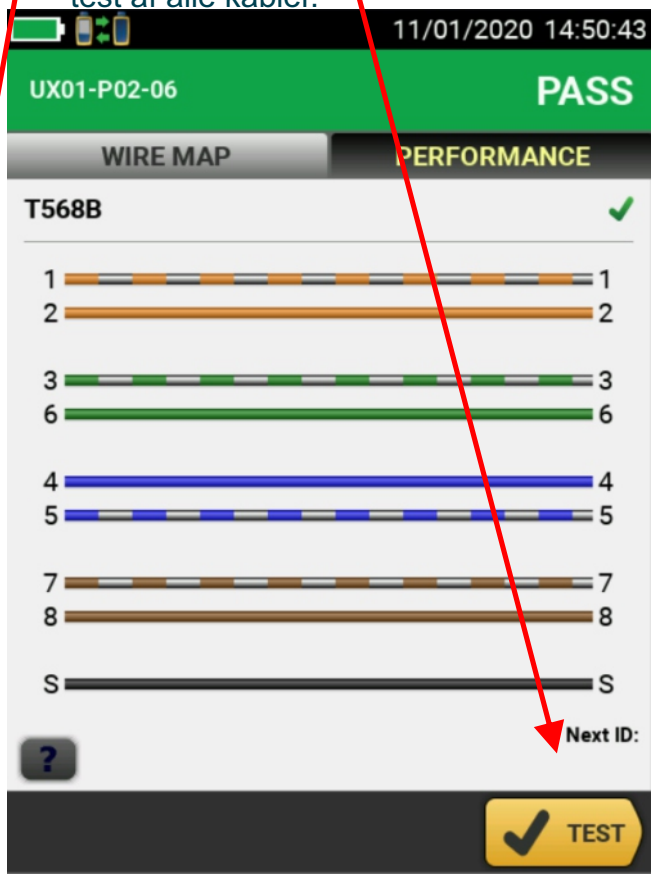


Test af kabelsæt

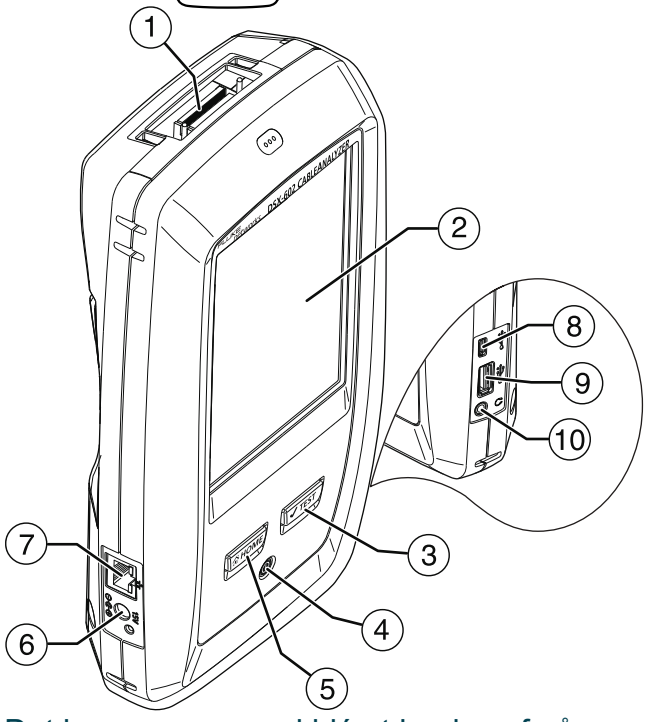
Kablet UX01-P01-01 er nu testet OK.
Tryk her for test af næste kabel.



Det næste kabel, der bliver testet kan du se her. Når der ingenting står, er du færdig med test af alle kabler.

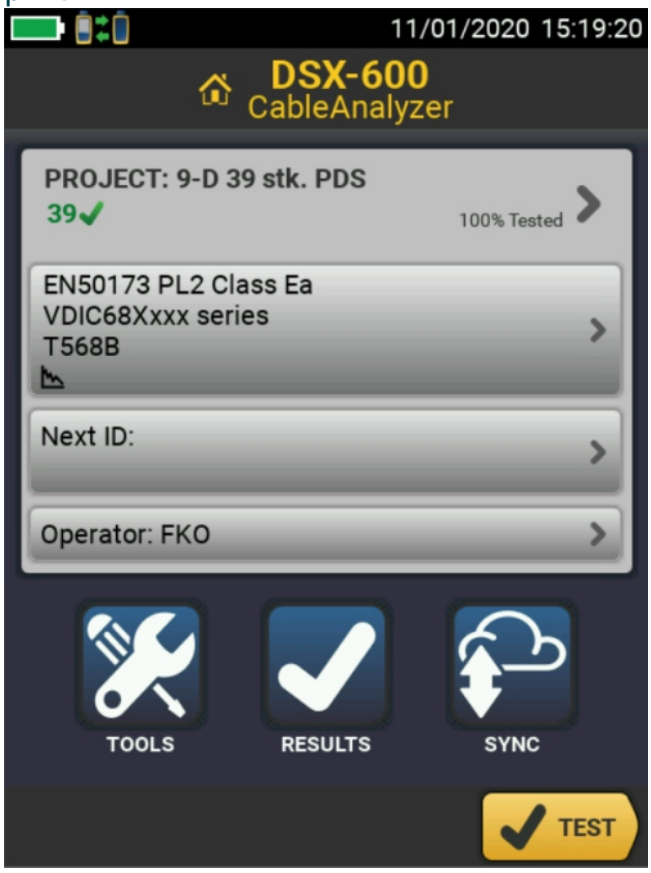


Når alle tests er udført, trykkes på knappen [Home] (5) HOME på Main Tester



Det kan være en god idé at krydse af på listen, hver gang du har testet et kabel, således at du har det fulde overblik over hvor langt du er nået, og hvornår du er færdig med at teste alle kabler.

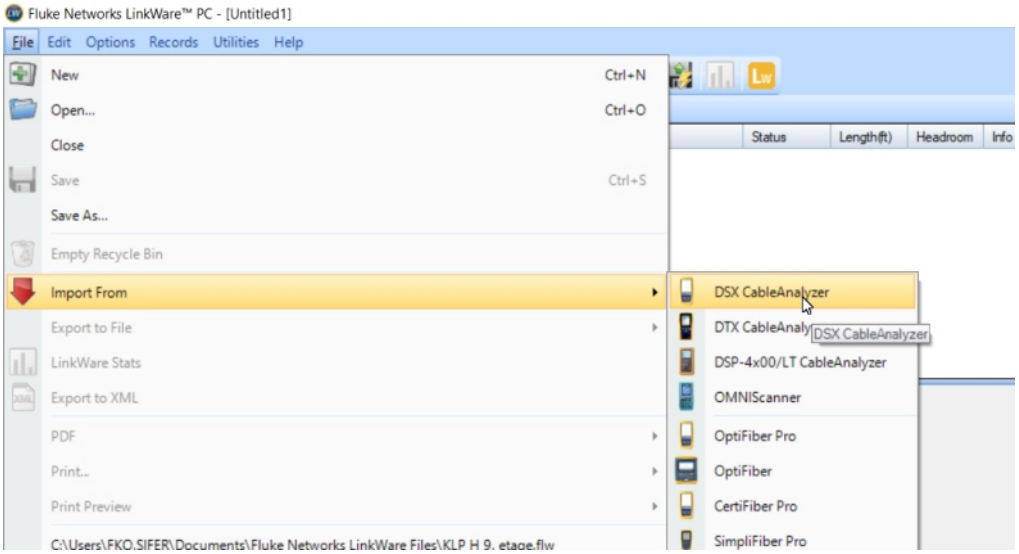
Nu er alle kabler testet, og projektet er klar til overførsel til pc for arkivering og eventuelt print.



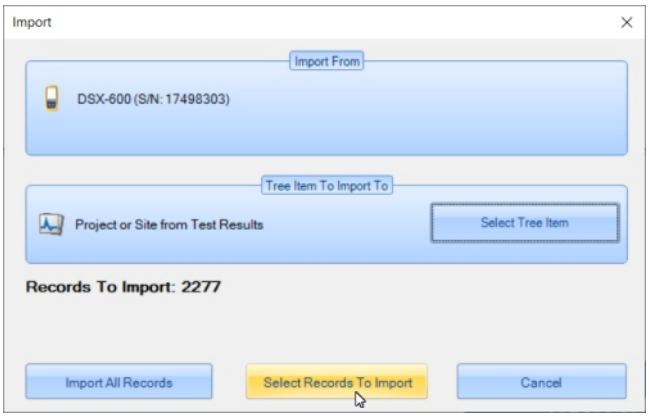
Overførsel til pc

Testene kan overføres fra tester til pc via USB-stick.
[Home Screen] → [RESULTS] → [TRANSFER] → [USB FlashDrive] → [Export results from this tester to a USB flash drive] Vælg pågældende projekt → [EXPORT] når overførelsen er færdig trykkes på [OK] tryk på [HOME] på Main Tester. Nu er testene på USB-stick og kan importeres til *Fluke Networks LinkWare™ PC* (Se side 35 i dette dokument).

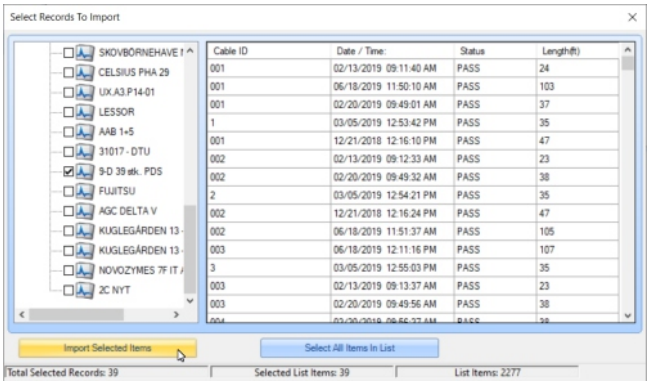
Overførsel via USB-kabel: Tænd for Main Tester og forbind den til din pc med USB-kabel. (Se eventuelt skitse på side 11)
Start computerprogrammet *Fluke Networks LinkWare™ PC* (Se side 35 i dette dokument).
Klik [File] → [Import From] → [DSX CableAnalyzer]



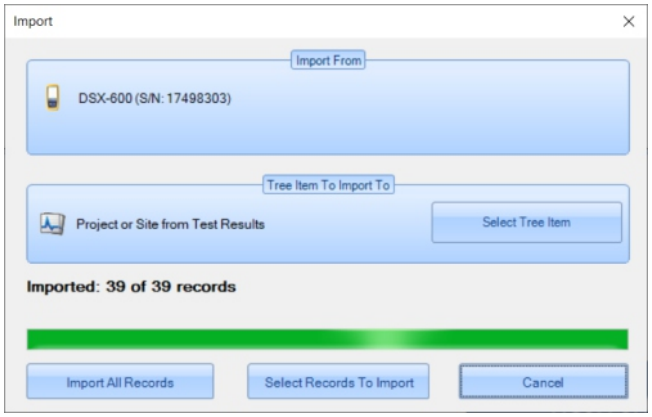
Klik [Select Records To Import]



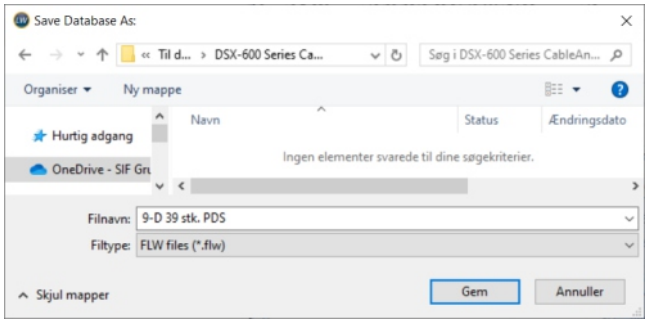
Sæt flueben i aktuelt projekt (9-D 39 stk. PDS)
Klik [Import Selected Items]



Nu er alle 39 test importeret.

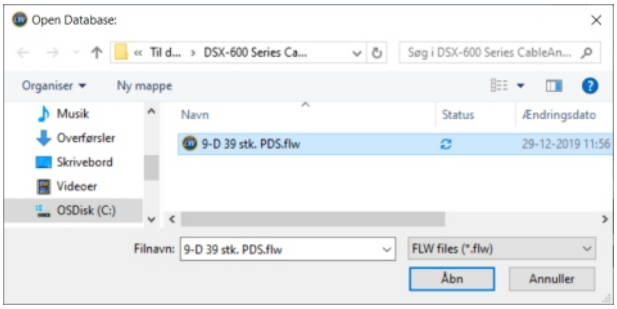


Du kan eventuelt gemme projektet på din pc.
Klik [File] → [Save As...]
Vælg et passende sted og filnavn og klik [Gem]

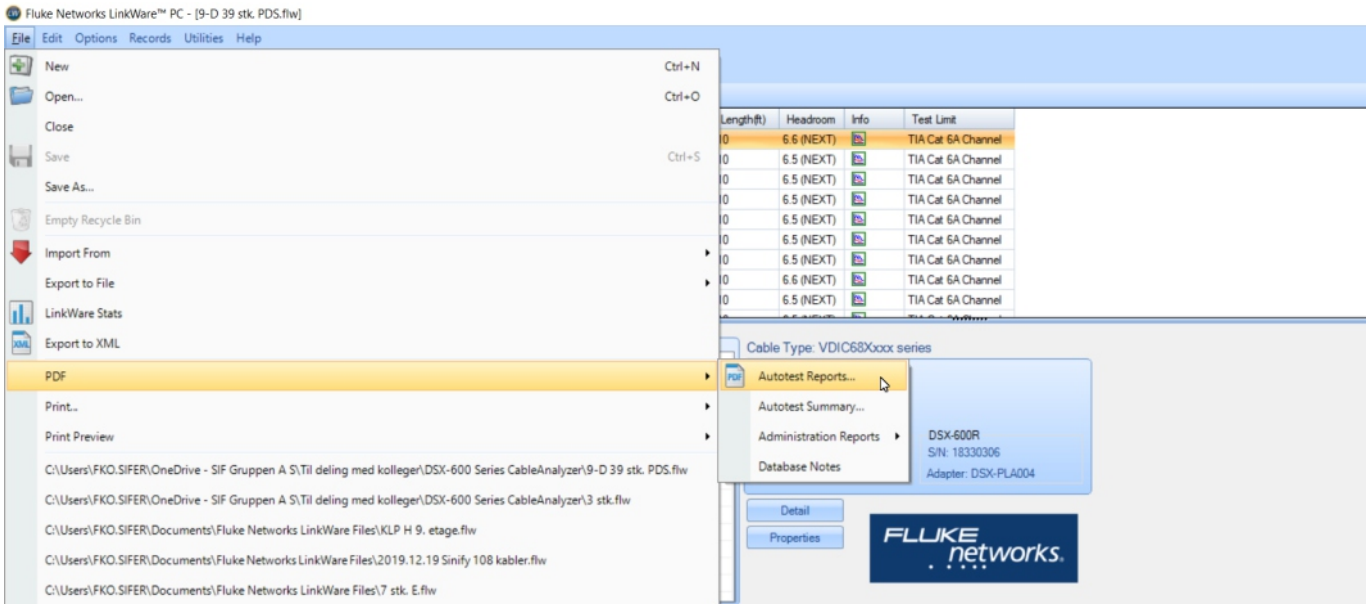


Generering af PDF-test-rapport

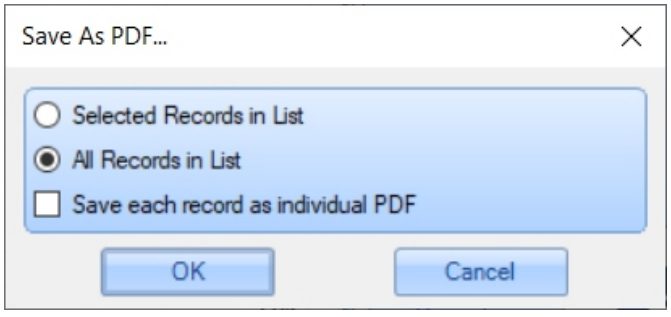
Start computerprogrammet: *Fluke Networks LinkWare™ PC* (Se side 35 i dette dokument).
Hvis ikke projektet allerede er åbent, åbnes det nu.
Klik [File] → [Open]
Marker den pågældende projektfil, (9-D 39 stk. PDS.flw), og klik [Åbn]



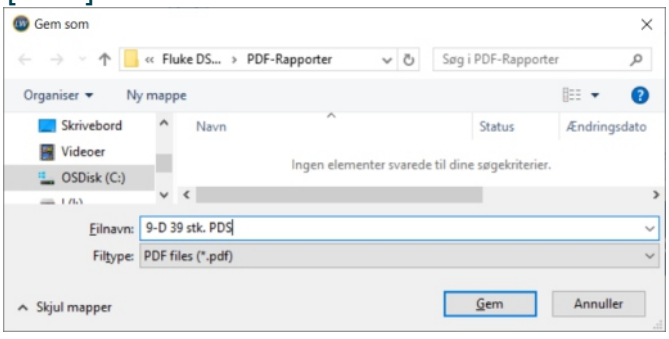
Klik [File] → [PDF] → [Autotest Reports...]



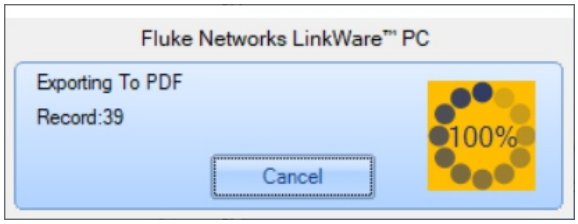
Marker [All Records in List] og klik [OK]



Vælg en passende placering og filnavn og klik [Gem]



Nu er PDF-rapporten lavet og kan deles.



PDF-test-rapport

Cable ID	Summary	Test Limit	Length	Headroom	Date / Time
UX01-P01-01	PASS	EN50173 PL2 Class Ea	3.2 m	3.4 dB (NEXT)	11/01/2020 14:28
UX01-P01-02	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:41
UX01-P01-03	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:43
UX01-P01-04	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:44
UX01-P01-05	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:44
UX01-P01-06	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:44
UX01-P01-07	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:44
UX01-P01-08	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:44
UX01-P01-09	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:45
UX01-P01-10	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:45
UX01-P01-11	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:45
UX01-P01-12	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:45
UX01-P01-13	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:46
UX01-P01-14	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:46
UX01-P01-15	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:46
UX01-P01-16	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:46
UX01-P01-17	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:46
UX01-P01-18	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:47
UX01-P01-19	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:47
UX01-P01-20	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:47
UX01-P01-21	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:47
UX01-P01-22	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:48
UX01-P01-23	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:48
UX01-P01-24	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:48
UX01-P02-01	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:48
UX01-P02-02	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:48
UX01-P02-03	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:49
UX01-P02-04	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:49
UX01-P02-05	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:49
UX01-P02-06	PASS	EN50173 PL2 Class Ea	3.2 m	3.2 dB (NEXT)	11/01/2020 14:49
UX02-P01-01	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:41
UX02-P01-02	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:42
UX02-P01-03	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:42
UX02-P01-04	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:42
UX02-P01-05	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:42
UX02-P01-06	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:42
UX02-P01-07	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:43
UX02-P01-08	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:43
UX02-P01-09	PASS	EN50173 PL2 Class Ea	3.2 m	3.3 dB (NEXT)	11/01/2020 14:43

PDF-test-rapport

Total Length:	124.8 m
Number of Reports:	39
Number of Passing Reports:	39
Number of Failing Reports:	0
Number of Warning Reports:	0
Documentation Only:	0

PDF-test-rapport

Cable ID: UX01-P01-01

Test Summary: PASS

Date / Time: 11/01/2020 14:28:43
Headroom 3.4 dB (NEXT 3,6-4,5)
Test Limit: EN50173 PL2 Class Ea
Cable Type: VDIC68Xxxx series
NVP: 82.0%

Operator: FKO
Software Version: V6.4 Build 4
Limits Version: V7.4
Calibration Date:
Main (Module): 21/10/2019
Remote (Module): 21/10/2019

Model: DSX-600
Main S/N: 17330350
Remote S/N: 17330351
Main Adapter: DSX-PLA004
Remote Adapter: DSX-PLA004

Length (m), Limit 90.0	[Pair 1,2]	3.2
Prop. Delay (ns), Limit 496	[Pair 3,6]	14
Delay Skew (ns), Limit 43	[Pair 3,6]	1
Resistance (ohms), Limit 20.60	[Pair 4,5]	0.71
Insertion Loss Margin (dB)	[Pair 3,6]	38.1
Frequency (MHz)	[Pair 3,6]	479.0
Limit (dB)	[Pair 3,6]	40.7

	Worst Case Margin		Worst Case Value	
N/A	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	3,6-4,5	3,6-4,5	3,6-4,5
NEXT (dB)	3.4	3.8	4.1	3.8
Freq. (MHz)	464.0	500.0	500.0	500.0
Limit (dB)	29.6	27.8	27.8	27.8
Worst Pair	3,6	3,6	3,6	3,6
PS NEXT (dB)	3.1	4.2	3.1	5.2
Freq. (MHz)	470.0	467.0	470.0	500.0
Limit (dB)	26.4	26.6	26.4	25.0

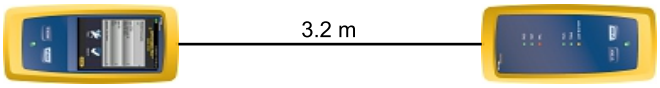
PASS	MAIN	SR	MAIN	SR
Worst Pair	7,8-4,5	4,5-7,8	7,8-4,5	7,8-4,5
ACR-F (dB)	13.5	13.6	14.1	14.1
Freq. (MHz)	2.9	3.4	500.0	500.0
Limit (dB)	56.1	54.7	11.3	11.3
Worst Pair	4,5	4,5	7,8	4,5
PS ACR-F (dB)	14.8	14.9	15.7	15.9
Freq. (MHz)	2.9	3.3	493.0	497.0
Limit (dB)	53.1	52.0	8.4	8.3

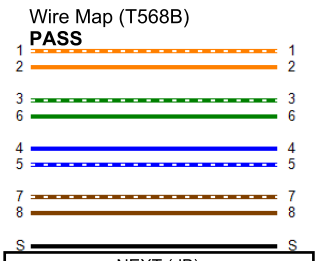
N/A	MAIN	SR	MAIN	SR
Worst Pair	3,6-4,5	1,2-3,6	3,6-4,5	3,6-4,5
ACR-N (dB)	21.8	21.0	42.0	41.7
Freq. (MHz)	4.6	5.1	500.0	500.0
Limit (dB)	59.1	58.4	-12.4	-12.4
Worst Pair	3,6	3,6	3,6	3,6
PS ACR-N (dB)	20.6	20.9	40.5	43.2
Freq. (MHz)	5.6	5.1	472.0	500.0
Limit (dB)	55.3	56.1	-13.4	-15.3

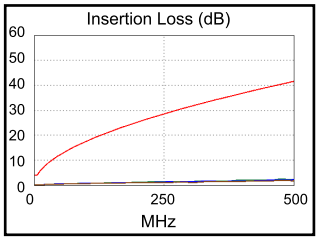
N/A	MAIN	SR	MAIN	SR
Worst Pair	4,5	4,5	4,5	4,5
RL (dB)	4.0	4.4	4.0	4.4
Freq. (MHz)	381.0	427.0	381.0	427.0
Limit (dB)	8.2	8.0	8.2	8.0

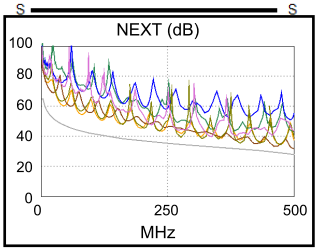
Compliant Network Standards:

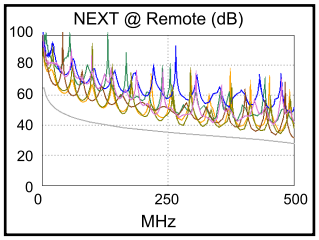
10BASE-T	100BASE-TX	100BASE-T4
1000BASE-T	2.5GBASE-T	5GBASE-T
10GBASE-T	ATM-25	ATM-51
ATM-155	100VG-AnyLan	TR-4
TR-16 Active	TR-16 Passive	

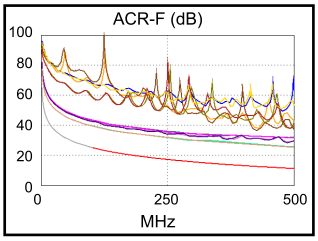


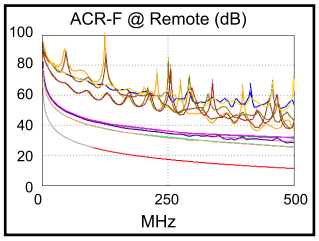


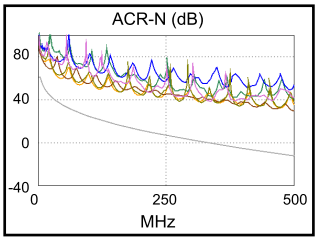


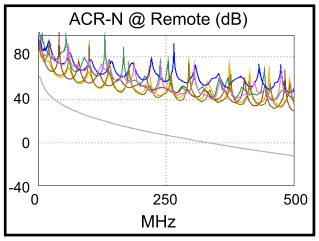


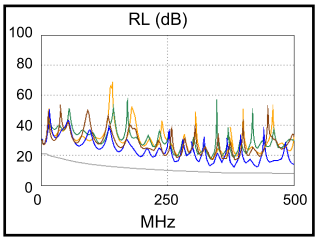


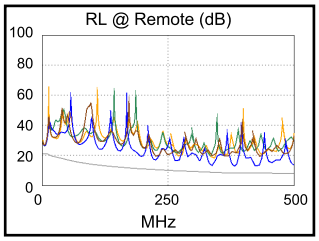












LinkWare™ PC Version 10.4

Project: 9-D 39 stk. PDS

9-D 39 stk. PDS.flw

Epilog

Jeg kan kun gentage, at du for at blive rigtig netværksnørd, har brug for meget mere end dette skriv kan give dig.
Både rent fagligt, men det kræver også en god portion rutine.
Altså praktisk erfaring i marken.

Det kan også være en god ide at “lege” lidt.
Altså lave forskellige øvelses-test, og bladre rundt i menuerne på testeren, for at se alle mulighederne.
Dertil kan du prøve bevidst at lave fejl, og se, hvordan det påvirker testresultaterne.

- Kortslutning eller forkert forbindelse i konnektorer

- Bøje kablet mere end den foreskrevne minumum-radius.
  (Kablet må ikke bøjes mere end som radius på en tennisbold, der dog nogen steder kan være svært at overholde)

- Klemme kablet med en strip
  (Strips må ikke anvendes til fixering af kabler. Der skal altid bruges velcrobånd for at undgå, at skærmen bliver beskadiget)

Som tidligere nævnt, er dette projekt udført med brug af pc i flere af faserne.
Dette er ikke absolut nødvendigt.
Med undtagelse af arkivering og udskrivning af rapporter, kan alt gøres direkte fra testeren.
Der er også mulighed for at uploade testresutater i skyen med LinkWare Live, så arkivering og deling bliver nemt og bekvemt.

Når jeg er så glad for at lave lister på pc, er det bl.a. fordi, at de ikke alene kan overføres til testeren, men også kan anvendes til at printe ID-labels til PDS-udtag og til opmærkning i patchpanel i rack.
Sidst men ikke mindst gør det efterfølgende dokumentation nemt.

Et andet vigtigt element, du dog i første omgang selv må prøve dig frem med, eller søge viden om andet steds, er, hvad du skal gøre, når du oplever fejl på de testede kabler.
Dette skriv omhandler jo et tænkt eksempel, hvor alting går som det skal.
I virkeligheden vil du opleve forskellige fejl, der hver især kræver sin løsning.
For at stille den rigtige diagnose og analyse af testresultater, kræves ovenstående viden og erfaring.
I den forbindelse er det en god ting, hvis du kan mobilisere en god portion logisk sans, fantasi og kreativitet.

Til eksemplet har jeg lavet et testkabel med konnektorer i begge ender.
Det er det samme kabel jeg har brugt til alle 39 tests.
Du kan således se, i testrapporten på side 26, at længden er målt til 3.2 m på alle kablerne.

På side 28 har jeg bragt bare en af de i alt 39 detaljerede test-rapporter.

Kommentarer og kritik til dette skriv vil være meget velkomment.

Med venlig hilsen
Flemming Koch
fko@sif.dk
Mobil: 26 32 29 76

DSX-600
CableAnalyzer
Getting Started Guide

The DSX-600 CableAnalyzer is a rugged, hand-held tester that lets you certify, troubleshoot, and document twisted pair network cabling.

Accessing the Product Manuals

This guide provides basic information to help you get started using the tester. For more detailed information, see the latest versions of the *DSX-600 Users Manual* and the *DSX-600 Technical Reference Handbook* provided on the Fluke Networks website.To download manuals, go to **www.flukenetworks.com/support**.

Symbols

	Warning or Caution: Risk of damage or destruction to equipment or software. See explanations in the manuals.
	Warning: Risk of fire, electric shock, or personal injury.
	Consult the user documentation.
	Do not connect this equipment to public communications networks, such as telephone systems.
	Conforms to the Appliance Efficiency Regulation (California Code of Regulations, Title 20, Sections 1601 through 1608), for small battery charging systems.
	Conformite Europeene. Conforms to the requirements of the European Union and the European Free Trade Association (EFTA).
	Certified by CSA Group to North American safety standards.
	Conforms to relevant Australian standards.
	Conforms to relevant Russian standards.
	EMC approval for Korea. Class A Equipment (Industrial Broadcasting and Communication Equipment). This product meets requirements for industrial (Class A) electromagnetic wave equipment and the seller or user should take notice of it. This equipment is intended for use in business environments and is not to be used in homes.
	This product complies with the WEEE Directive marking requirements. The affixed label indicates that you must not discard this electrical/electronic product in domestic household waste. Product Category: With reference to the equipment types in the WEEE Directive Annex I, this product is classed as category 9 "Monitoring and Control Instrumentation" product. Do not dispose of this product as unsorted municipal waste. To return unwanted products, contact the manufacturer's web site shown on the product or your local sales office or distributor.
	This Product contains a lithium-ion battery. Do not mix with the solid waste stream. Spent batteries should be disposed of by a qualified recycler or hazardous materials handler per local regulations. Contact your authorized Fluke Service Center for recycling information.
	40 year Environment Friendly Use Period (EFUP) under China Regulation - Administrative Measure on the Control of Pollution Caused by Electronic Information Products. This is the period of time before any of the identified hazardous substances are likely to leak out, causing possible harm to health and the environment.
	This key turns the Product on and off.

Safety Information

Warning

To prevent possible fire, electric shock, or personal injury:

- **Read all safety information before you use the Product.**
- **Carefully read all instructions.**
- **Do not connect the tester to telephony inputs, systems, or equipment, including ISDN inputs. Doing so is a misapplication of this product, which could result in damage to the tester and create a potential shock hazard to the user.**

2

PN 4885120 (English) May 2017, Rev. 1 4/2018

- Do not open the case. You cannot repair or replace parts in the case.
- Do not modify the Product.
- Use only replacement parts that are approved by Fluke Networks.
- Do not touch voltages > 30 V AC rms, 42 V AC peak, or 60 V DC.
- Do not use the Product around explosive gas, vapor, or in damp or wet environments.
- Use this Product indoors only.
- Do not connect the Product to voltages that are higher than the maximum voltage rating for the Product.
- For Products that have multiple connectors for different types of tests on copper cabling, disconnect unused test leads from the connectors before you do a test.
- Use the Product only as specified, or the protection supplied by the Product can be compromised.
- Do not use and disable the Product if it is damaged.
- Do not use the Product if it operates incorrectly.
- Batteries contain hazardous chemicals that can cause burns or explode. If exposure to chemicals occurs, clean with water and get medical aid.
- Remove the batteries if the Product is not used for an extended period of time, or if stored in temperatures above 50 fIC. If the batteries are not removed, battery leakage can damage the Product.
- Replace the rechargeable battery after 5 years of moderate use or 2 years of heavy use. Moderate use is defined as recharged twice a week. Heavy use is defined as discharged to cutoff and recharged daily.
- Disconnect the battery charger and move the Product or battery to a cool, non-flammable location if the rechargeable battery becomes hot (>50 fIC, >122 fIF) during the charge period.The battery door must be closed and locked before you operate the Product.
- Repair the Product before use if the battery leaks.
- Recharge the batteries when the low battery indicator shows to prevent incorrect measurements.
- Turn off the Product and disconnect all test leads, patch cords, and cables before you replace the battery.
- Do not disassemble or crush battery cells and battery packs.
- Do not put battery cells and battery packs near heat or fire. Do not put in sunlight.
- Do not operate the Product with covers removed or the case open. Hazardous voltage exposure is possible.
- Remove the input signals before you clean the Product.
- Have an approved technician repair the Product.
- Do not put metal objects into connectors.
- For Products with rechargeable batteries, use only AC adapters approved by Fluke Networks for use with the Product to supply power to the Product and charge the battery.

⚠ Caution

To prevent damage to the Product or cables under test and to prevent data loss, read all safety information given in all documentation supplied with the Product.

Connectors, Keys, and LEDs

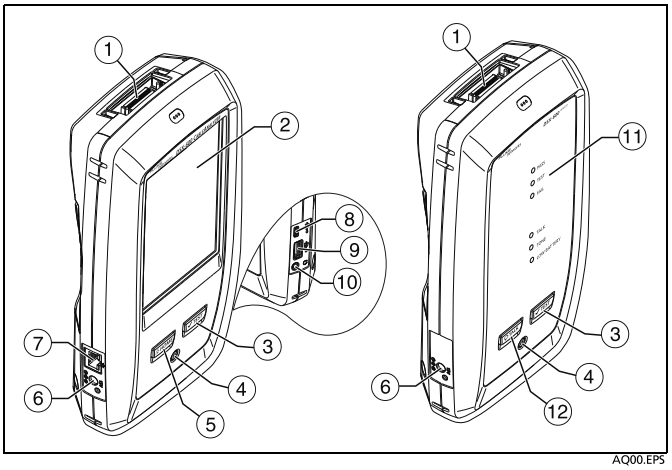


Figure 1. Connectors, Keys, and LEDs

3 4

① Connector for a link interface adapter.

② LCD display with touchscreen.

③ TEST: Starts a test. To start a test, you can also tap **TEST** on the display.

④ Power button.

⑤ HOME: Press HOME to go to the home screen.

⑥ Connector for the AC adapter. The LED is red when the battery charges, and green when the battery is fully charged. The LED is yellow if the battery will not charge.

⑦ RJ45 connector: Lets you connect to a network for access to Fluke Networks cloud services.

⑧ Micro USB port: This USB port lets you connect the tester to a PC so you can upload test results to the PC and install software updates in the tester.

⑨ Type A USB port: This USB host port lets you save test results on a USB flash drive or connect a Wi-Fi adapter for access to Fluke Networks cloud services.

⑩ Headset jack.

⑪ **PASS** LED comes on when a test passes.

TEST LED comes on during a test.

FAIL LED comes on when a test fails.

TALK LED comes on when the talk function is on (see ⑫). To adjust the volume, press TALK or the button on the headset's microphone.

TONE LED flashes and the toner comes on when you press TEST and a main tester is not connected to the remote.

LOW BATTERY LED comes on when the battery is low.

Note

The LEDs also operate as a battery gauge when you turn on the remote. See the Users Manual.

⑫ TALK: Press TALK to use the headset to speak to the person at the other end of the link. Press again to adjust the volume. To turn off the talk function, hold down TALK.

How to Certify Twisted Pair Cabling

1 Power the Tester

Charge the battery if necessary. Connect the AC adapter to AC power and to the adapter connector (⑥) shown in Figure 1. You can use the tester while the battery charges.

2 Select Settings

2-1 On the home screen, tap the test setup panel (see Figure 2, number ②).

2-2 On the **CHANGE TEST** screen, tap a twisted pair test, then tap **EDIT.**

2-3 On the **TEST SETUP** screen, tap the panels to change settings.

2-4 To save the settings, tap **SAVE** on the **TEST SETUP** screen.

AQ01.EPS

Figure 2. Panels on the Home Screen

① To set up a project, tap the **PROJECT** panel.

② To change settings for the test or select a different test, tap the test setup panel.

③ To set up cable IDs and turn on **Auto Save**, tap the **Next ID** panel.

④ To upload test results to LinkWare Live, tap **SYNC.**

3 Set the Reference

3-1 Turn on the tester and the remote a minimum of 5 minutes before you set the reference.

Note

Set the reference only after the testers are at an ambient temperature between 50 fIF and 104 fIF (10 fIC and 40 fIC).

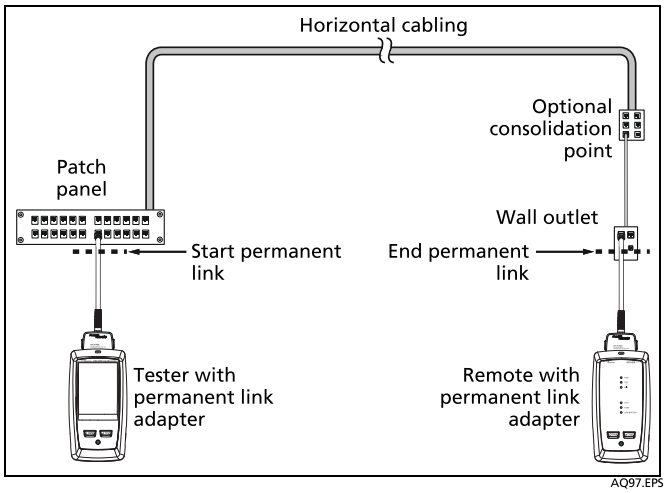
3-2 On the home screen, tap **TOOLS**, then tap **Set Reference.**

3-3 Make the connections to set the reference as shown on the screen, then tap **TEST.**

4 Make Connections and Do a Test

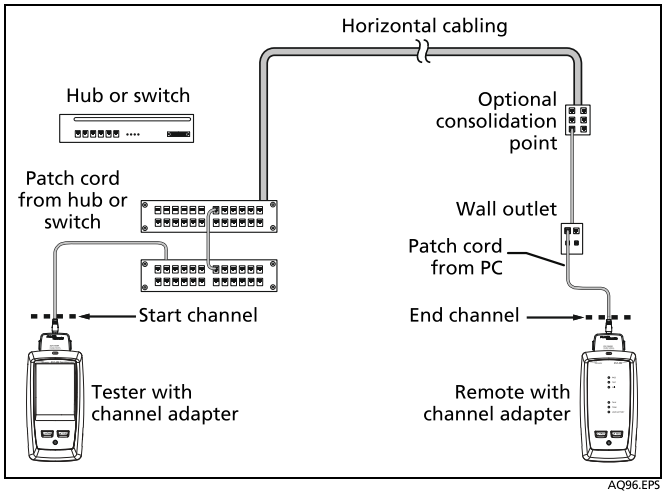
4-1 Connect the testers to the link as shown in Figure 3 or 4.

4-2 Tap **TEST** on the main tester or press TEST on the main or remote tester.



AQ97.EPS

Figure 3. Permanent Link Connections



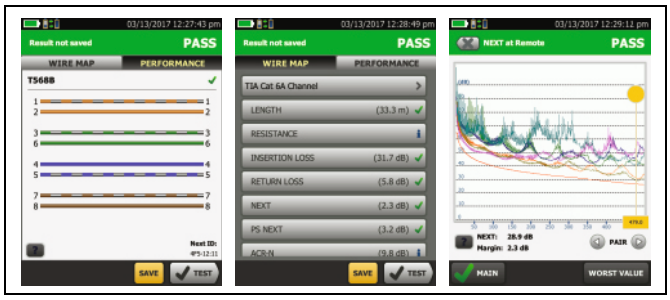
AQ96.EPS

Figure 4. Channel Connections

5 Examine the Results

The tester shows multiple views of the test results (Figure 5):

- **WIRE MAP**: Shows the connections between the ends of the cable under test. The tester compares the connections to the selected **Outlet Configuration** to get a **PASS** or **FAIL** result.
- **PERFORMANCE**: Shows the overall result for each test that is required by the selected test limit. To see detailed results for a test, tap the panel.



AQ02.EPS

Figure 5. Examples of Twisted Pair Results Screens

6 Save the Results

6-1 Tap **SAVE** if the test passed or **FIX LATER** if the test failed.

6-2 If the **Cable ID** box shows the correct ID, tap **SAVE.**

To enter a cable ID, tap the **Cable ID** box on the **SAVE RESULT** screen, use the keyboard to enter a name for the results, tap **DONE**, then tap **SAVE.**

The tester saves the results in the **DEFAULT** project, unless you selected a different project.

About Projects

You can set up a project to specify the settings and tests necessary for a job, monitor the status of a job, and organize the test results.

To start a new project, tap **PROJECT** on the home screen, tap **CHANGE PROJECT**, then tap **NEW PROJECT**. See the Users Manual or Technical Reference Handbook for more information.

About Fluke Networks Cloud Services

With a Fluke Networks web account and a wired or wireless network connection, you can use the LinkWare™ Live web application to store and manage projects in the cloud.

Go to **https://www.linkwarelive.com/signin** or see the Users Manual or Technical Reference Handbook for more information.

Registration

Registering your product with Fluke Networks gives you access to valuable information on product updates, troubleshooting tips, and other support services.

To register, use LinkWare PC software. Download LinkWare PC from the Fluke Networks website.

Contact Fluke Networks

www.flukenetworks.com/support
info@flukenetworks.com
1-800-283-5853, +1-425-446-5500

Fluke Networks
6920 Seaway Boulevard, MS 143F
Everett WA 98203 USA

Fluke Networks operates in more than 50 countries worldwide. For more contact information, go to our website.

General Specifications

Battery Type	Lithium-ion
Power Adapter	Input: 100 to 240 VAC ±10%, 50/60Hz Output: 15 VDC, 2 A maximum Class II
Temperature	Operating: 0 °C to +45 °C Storage: -10 °C to +60 °C
Altitude	Operating: 4,000 m (3,200 m with AC adapter) Storage: 12,000 m

Warranty

Limited 1-year warranty. See the product manual for details.

Fluke Networks LinkWare™ PC

For at hente computerprogrammet *Fluke Networks LinkWare™ PC,* skal du være oprettet som bruger og være logget ind hos Fluke Networks.

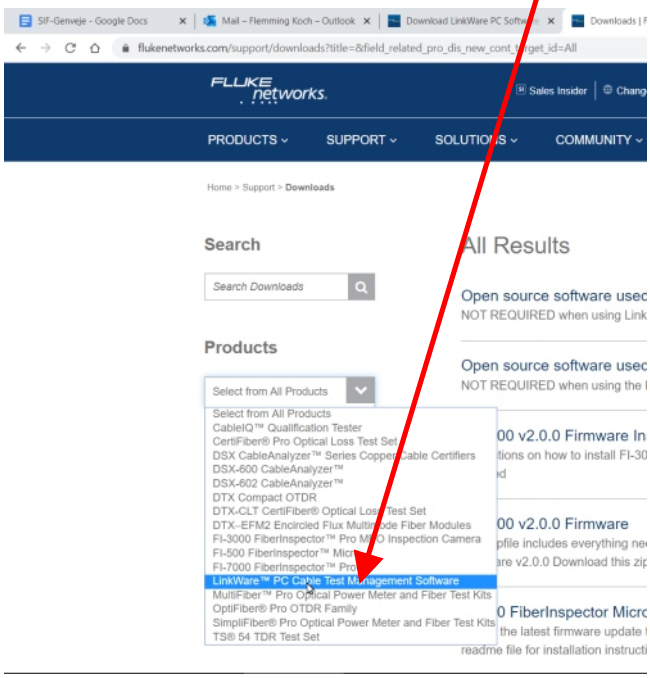
Du kan oprette dig her: https://www.flukenetworks.com/user/login

Scroll ned til: [Create Account] og udfyld alt det, der er markeret med stjerner.

Klik på: [Create new account]

Programmet hentes her: [Downloads & Updates] → [See All Downloads & Updates]

I drop down listen [Products] vælges LinkWare PC™ Cable Test Management Software



Klik nu på:
LinkWare PC Software 10.4
(Standalone Install Version)
og installationsfilen:
lw_10.4_build10_single.exe
downloades til din pc og kan installeres.